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DISSERTATION

Occupational Burnout and Retention of Air Force Distributed Common Ground System (DCGS) Intelligence Personnel

John K. Langley

This document was submitted as a dissertation in September 2012 in partial fulfillment of the requirements of the doctoral degree in public policy analysis at the Pardee RAND Graduate School. The faculty committee that supervised and approved the dissertation consisted of Lisa Meredith (Chair), Larry Hanser, and Wayne Chappelle.

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Preface

This dissertation concerns occupational burnout and retention of Air Force intelligence analysts working in the Distributed Common Ground System, and was submitted in September 2012 in partial fulfillment of the requirements of the doctoral degree in public policy analysis at the Pardee RAND Graduate School. The faculty committee that supervised and approved the dissertation consisted of Lisa Meredith (Chair), Larry Hanser, and Wayne Chappelle. This dissertation was supported by two federally-funded research and development centers at RAND: Project Air Force and the National Security Research Division (Forces and Resources Policy Center). Analytic support was provided by Eagle Applied Sciences, LLC, through the United States School of Aerospace Medicine at Wright-Patterson Air Force Base, OH. The views expressed in this dissertation are those of the author and do not reflect the official policy or position of the United States Air Force, Department of Defense, or the U.S. Government.

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Summary

This dissertation sought to answer two policy questions for Air Force leadership and mental health providers. First: is there sufficient reason to be concerned about occupational burnout among DCGS intelligence personnel? Second: to the extent that these issues exist, what can be done to mitigate occupational burnout and attrition of DCGS intelligence personnel?

Chapter 1 reviewed the literature on occupational burnout to determine whether DCGS intelligence personnel might be at increased risk of experiencing high levels of exhaustion, high levels of cynicism, and low levels of professional efficacy – the three facets of burnout. Risk factors were organized into five categories relevant to the DCGS context: operational, organizational, combat-related, deployed in garrison, and demographic. In describing the crucial role played by the DCGS in modern U.S. military operations, Chapter 1 made the case that the adverse consequences of burnout (including negative health outcomes, reduced performance and reduced retention) are serious enough to justify the research effort.

Chapter 2 described how USAFSAM surveyed a major stateside DCGS location and what types of data were collected. Measures included a number of potential risk factors for burnout, scores for the three facets of burnout, and consequences of burnout in terms of turnover intentions. A pile sort technique was employed to analyze the self-reported sources of occupational stress affecting performance, and basic descriptive statistics analyzed the differences between intelligence personnel and support personnel at the same location. Ordinary Least Squares regression modeling was conducted to determine which variables were associated with increased burnout, and whether burnout was associated with turnover intentions.

Chapter 3 reported that intelligence personnel reported issues concerning shift work and long hours affected their performance more than any other source of occupational stress. Additionally, they report leadership management concerns and training/mentorship issues much more frequently than personnel who are not in intelligence-related career fields. Intelligence personnel also reported significantly higher levels of emotional exhaustion and cynicism, and a greater percentage met cutoffs for experiencing significantly high levels of these two facets of burnout. The factors with the strongest association with increased burnout (in any facet) were working an abnormal shift and working more than 50 hours per week. Being 25 or younger and being on the job for less than 12 months were associated with decreased levels of burnout. Despite some elevated levels of exhaustion and cynicism, most airmen responding to the survey indicated generally high levels of professional efficacy. No facet of burnout appeared to play a meaningful role in intentions to reenlist.

In light of these findings and the aforementioned policy objectives, Chapter 4 made the following recommendations:

1. Reduce the need for extended hours and abnormal shifts.
2. Actively promote a sense of professional efficacy.
3. Determine what other burnout risk factors may be impacted by policy.
4. Prioritize retention of trained intelligence analysts.
5. Leverage unit medical personnel for monitoring and treatment of burnout.

This chapter also advocated several related categories of research for the future, including automating technologies to reduce PED manpower requirements, evaluation of DCGS analytic capacity in a changing operational environment, longitudinal studies of burnout and subsequent retention behavior, and cost-benefit analysis of incentive pay for retaining experienced analysts.

Despite some limitations to the research, this dissertation should be of interest to current DCGS commanders and, more broadly, other organizations concerned about burnout or attrition of their workforces. In the former case, these findings concern a current, relevant policy issue in a critical mission area for the Air Force.

Acknowledgements

I believe every good gift comes from God, including the amazing experiences and opportunities afforded to me by a three year assignment at RAND. For these blessings in particular, I am most thankful.

I owe an enormous debt of gratitude to my dissertation committee: Lisa Meredith, Larry Hanser and Wayne Chappelle. Lisa generously provided countless hours of patient mentorship over two years, and I could not have asked for a more supportive and encouraging committee chair. Larry always brought new insights to my work, and helped iron out some significant bumps along the way. Given the short time frame, I was fortunate to be able to study a topic in which I was keenly interested, and that would have been extremely difficult without Wayne. Not only did he work to get the backing of DCGS leadership to allow me access to these data, but he provided in-depth feedback throughout the process. I am also thankful for his perspective from the Air Force as I prepare for pilot training. Many thanks are also due to Tanya Goodman, Billy Thompson and Lt. Col. Lillian Prince of Eagle Applied Sciences, LLC for their many meetings and responsive statistical support.

I was privileged to work with Amado Cordova and Lance Menthe on their project for automating technologies for the DCGS. As part of that work, I was able to spend a lot of time observing DCGS operations and speaking with many of the intelligence analysts who dedicate their talents to serving others every single day. I am sincerely grateful to all of these quiet professionals, largely unnoticed and yet depended upon by so many around the world.

This dissertation would not have been completed but for the funding from Project Air Force and the National Security Research Division at RAND. I thank Natalie Crawford, Don Stevens and Rachel Swanger for their part in ensuring I had everything necessary to finish the degree.

To my parents, Ken and Jennifer Langley, I will always be thankful because of the love of reading and learning they instilled in me from a very early age. Finally, I would like to thank my wife, Kirsten, for her loving support and encouragement through even the most challenging times over the last three years – I truly could not have done it without her.

Abbreviations

32 CFR 219	Code of Federal Regulations for Title 32 [National Defense], on Protection of Human Subjects
AFI 40-402	Air Force Instruction on Protection of Human Subjects in Biomedical and Behavioral Research
AFRL	Air Force Research Laboratory
AFSC	Air Force Specialty Code
CAP	Combat Air Patrol
CSAF	Chief of Staff of the Air Force
DCGS	Distributed Common Ground System
FMV	Full-Motion Video
FY	Fiscal Year
HSPC	Human Subjects Protection Committee
IED	Improvised Explosive Device
IRB	Institutional Review Board
ISR	Intelligence, Surveillance and Reconnaissance
MBI-GS	Maslach Burnout Inventory – General Survey
OLS	Ordinary Least Squares
PED	Processing, Exploitation and Dissemination
RPA	Remotely-Piloted Aircraft
SIGINT	Signals Intelligence

USAF	United States Air Force
USAFSAM	United States Air Force School of Aerospace Medicine

Chapter 1. Introduction

Motivation and Research Questions

Concerns have been raised by United States Air Force (USAF) leadership and mental health providers that intelligence personnel working in the Distributed Common Ground System (DCGS) may be at high risk for experiencing burnout. Addressing those concerns, this dissertation has two overarching policy objectives:

- 1) To determine whether there is cause for concern regarding occupational burnout among DCGS intelligence personnel.
- 2) To make recommendations to leadership that could help improve the psychological well-being and retention of DCGS intelligence personnel.

This study addresses the first policy objective by (a) reviewing the literature on occupational burnout to establish a hypothetical basis, and (b) establishing an empirical basis with qualitative and quantitative analyses of survey responses from a sample of DCGS intelligence personnel working at an operational location in the continental United States. These analyses also help to address the second policy objective and are focused on self-reported sources of occupational stress, prevalence of burnout, risk factors for burnout and turnover intentions among DCGS intelligence personnel. The specific research questions addressed herein are as follows:

- 1a) What are the main self-reported sources of occupational stress among Air Force DCGS intelligence personnel?
- 1b) Do these sources differ from those reported by support personnel at the same installation?

- 2) Do self-reported levels of exhaustion, cynicism and professional efficacy (three facets of occupational burnout) among Air Force DCGS intelligence personnel differ from levels reported by support personnel at the same installation?

- 3a) What proportion of Air Force DCGS intelligence personnel report high levels of exhaustion, high levels of cynicism, and/or low levels of professional efficacy?
- 3b) Do those proportions differ among support personnel at the same installation?

- 4a) Among Air Force DCGS intelligence personnel, what are the associations of demographic and occupational variables with self-reported levels of exhaustion, cynicism, and professional efficacy?
- 4b) Do these associations differ among support personnel at the same installation?

- 5a) Among Air Force DCGS intelligence personnel, what is the relationship between self-reported levels of exhaustion, cynicism, and professional efficacy and self-reported intent to remain in the Air Force?
- 5b) Does this relationship differ among support personnel at the same installation?

- 6a) Among Air Force DCGS intelligence personnel, what is the relationship between self-reported levels of exhaustion, cynicism, and professional efficacy and self-reported intent to remain in the current career field?
- 6b) Does this relationship differ among support personnel at the same installation?

To demonstrate why burnout is such a critical issue to address for DCGS intelligence personnel, it is first necessary to have an understanding of the vital role played by the DCGS in U.S. military operations. A working definition of burnout is also required. This chapter illustrates why there is good reason to believe that burnout could be an issue in this population in particular by discussing several categories of risk factors. Finally, this chapter briefly explores some of the negative effects of burnout. In short, burnout could have serious implications for the ability of the DCGS to meet its mission demands.

Role of the USAF Distributed Common Ground System

The DCGS is a critical part of the Air Force's intelligence operations. This section describes why the DCGS is so crucial, and thus why its personnel are an important population to study. The growing amount of airborne intelligence collected by the Air Force is already staggering, but largely useless without analysis of its content and context. Because the DCGS intelligence personnel bear primary responsibility within the Air Force for this analysis, they are subject to increased workload and levels of responsibility to meet the heavy demands of 24/7 combat operations.

Demand for intelligence analysis is already high, and rapidly increasing.

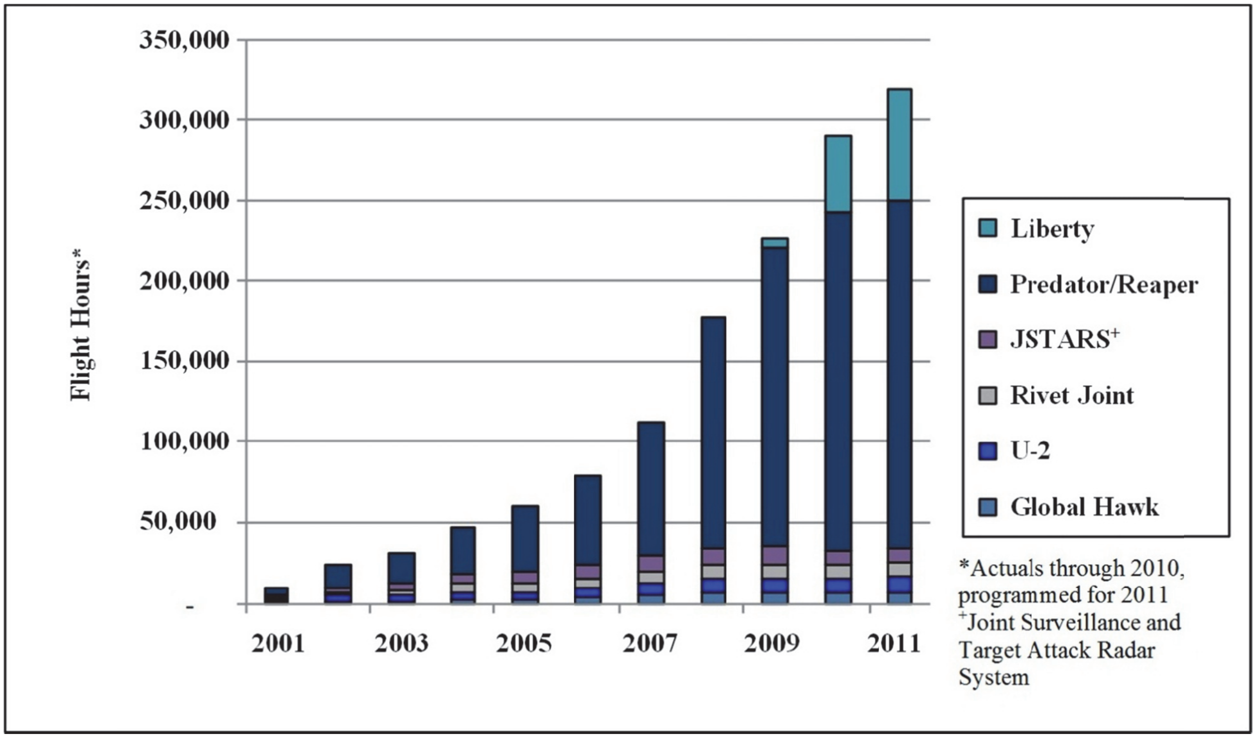
As described in the Air Force's Fiscal Year (FY) 2012 Budget Overview, the Air Force core function of Global Integrated Intelligence, Surveillance and Reconnaissance (ISR) "enables warfighters to locate the enemy, avert enemy plans, deliver weapons on target and assess the impact of their efforts. This persistent surveillance provides critical support to military operations and national security objectives" (FY 2012 Budget Overview, 2011). In his CSAF [Chief of Staff of the Air Force] Vector 2011, General Norton Schwartz affirms this point by noting "the Air Force depends increasingly on ISR to plan and execute operations, but we are not the only consumers. National leaders, Joint teammates, and coalition partners depend on our timely delivery of persistent surveillance, responsive reconnaissance, and comprehensive intelligence" (Schwartz, 2011).

In FY11, the Air Force reached 57 continuously on-station combat air patrols (CAPs)[1] of remotely-piloted aircraft (RPA), and is pressing forward towards the current goal of 65 CAPs by FY13 (FY 2012…, 2011). Indeed, General Schwartz later focuses on "surging delivery of RPA combat air patrols to meet theater-level ISR demands and solidifying our plan for steady-state RPA operations over the long term" (Schwartz, 2011). In other words, RPA operations are a critical and growing part of the Air Force's mission, and their number and importance are only going to increase in the foreseeable future. Figure 1.1 reflects the exponential growth of ISR

[1] In this context, a combat air patrol refers to the aircraft providing 24-hour ISR or weapons support to a particular region; due to endurance, transit time and repairs, continuously sustaining one CAP requires several aircraft.

operations over the past decade by illustrating the increased flight hours of seven ISR aircraft. The bulk of the growth has come from increased acquisition and operation of two RPA: the MQ-1 Predator and the MQ-9 Reaper. These aircraft can stay aloft for over 20 hours at a time, so they are particularly useful for providing persistent surveillance.

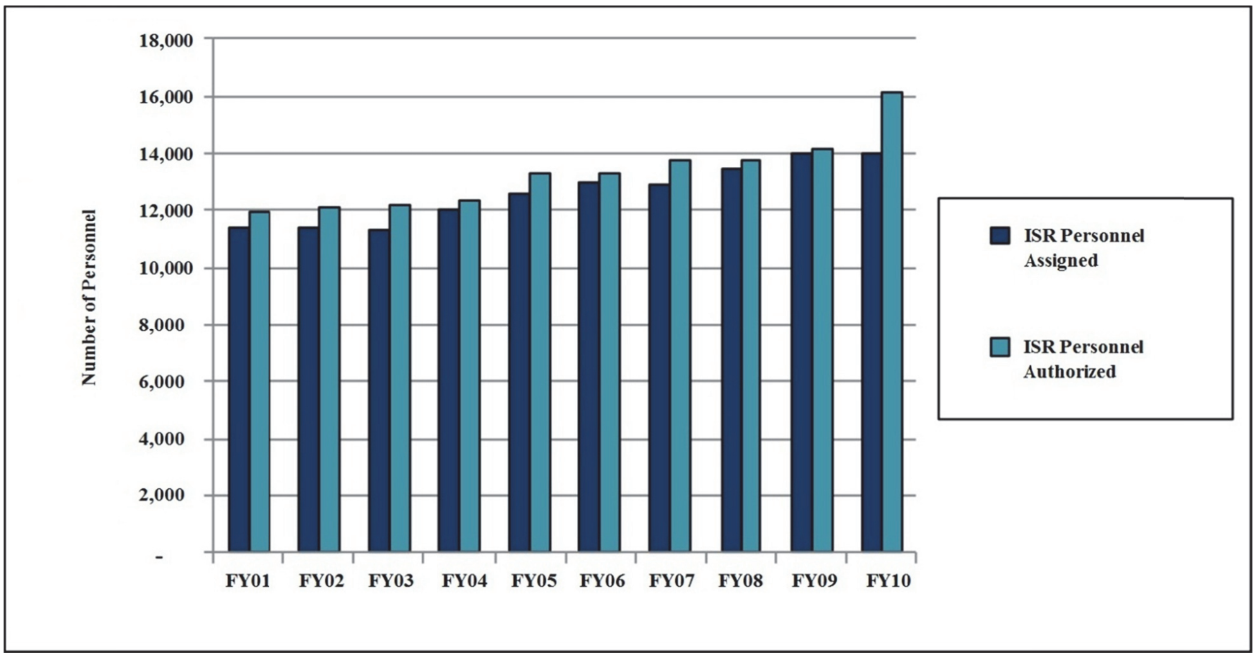
Figure 1.1 – ISR Operational Growth in Flight Hours of ISR Aircraft (Modified from Air Force FY 2012 Budget Overview)



In 2010, Air Force RPA alone (not counting RPA operated by the Army, Navy or Marine Corps) provided more than 30,000 hours of full motion video (FMV) and 11,000 high-resolution images per month, in addition to constant streams of signals intelligence (SIGINT) (FY 2012…, 2011). The RPA-related increase in data is striking, yet only represents a portion of the overall increase in ISR data. Non-RPA sources continue to provide more and more information as well.

Unfortunately, the number of necessary intelligence analysts has struggled to keep pace even as reliance on their skills has grown. This has resulted in a near-constant “surge” status for these personnel, where they operate at an increased tempo (longer hours) to meet demand (Braisted, 2011). Recognizing the need for additional personnel, the Air Force has steadily increased the number of authorized ISR positions, but has consistently been unable to fully man these positions, as Figure 1.2 demonstrates.

Figure 1.2 – Air Force ISR Personnel Authorized and Assigned (Air Force FY 2012 Budget Overview)



The USAF FY11 Force Structure Announcement details some of the recent increases in the size of the Total Force ISR manpower base (FY11 Force Structure Announcement, 2010). However, it must be emphasized that additional personnel alone will be unable solve the problem. Right now, in terms of FMV, most aircraft provide only a “soda straw” look. This narrow field of view over a small geographic area has been more than sufficient to stretch our analytic resources. Newer imaging technologies, such as the nine-camera Gorgon Stare, provide the ability to surveil an entire city at once with a single sensor package (Whitlock, 2011). Additionally, ongoing research is exploring how to transfer the reams of information gathered by the stealthy F-22 Raptor and F-35 Joint Strike Fighter to the Air Force's intelligence analysts (Majumdar, 2012), further increasing the supply of raw intelligence data. As these technologies come online, demand for processing, exploitation, and dissemination (PED) of the data will grow exponentially.

Accordingly, the CSAF Vector 2011 includes a focus on “researching new autonomous and semi-autonomous capabilities to assist in [ISR PED]” (Schwartz, 2011). Lt. Gen (ret). David Deptula concurs. Regarding fusion of FMV with still imagery and SIGINT, Deptula says, "Making this automatic is an absolute must" (Magnuson, 2010). Indeed, much research has already been conducted in this realm, and the need for automation technologies has long been recognized (Menthe et al., 2010; Cordova et al., 2011). Unfortunately, such technologies are still years away from full implementation. In the meantime, intelligence analysts are left facing a workload that may overwhelm them.

The bulk of airborne intelligence is analyzed primarily at DCGS.

The trend of increasing demand for PED has been firmly established. Most pertinent to this dissertation is that the bulk of airborne intelligence analysis is conducted by personnel working in the DCGS, the Air Force's "premier globally networked intelligence, surveillance and reconnaissance weapon system" (Air Force Distributed Common Ground System, 2011). These analysts receive raw data from RPA (e.g., MQ-1 Predator, MQ-9 Reaper or RQ-4 Global Hawk) as well as manned platforms (e.g. MC-12 Liberty or U-2 Dragon Lady) that are supporting ISR operations.

So what exactly is the DCGS? It is ***distributed:*** comprised of several core sites and over 30 smaller sites both within the United States and around the globe. Despite the physical separation of the nodes, DCGS is ***common:*** each site is networked to all of the others. While a given site is generally assigned a primary area of responsibility (paired with its corresponding Numbered Air Force), the networked nature of the weapon system allows any site to receive data from any of the aforementioned aerial platforms operating anywhere in the world. This allows for some flexibility in terms of mission responsibilities – if one station becomes overloaded, a different station can help with the surplus. The stations are operated from the ***ground:*** some operating locations are fixed, others are portable. While the information it receives comes from airborne assets, these assets are not considered part of the DCGS itself. Finally, it is a ***system.*** At its core, DCGS is the sophisticated network of hardware and software that allows instant access to real-time intelligence from across the world.

However, this system is rendered useless without the thousands (Air Force ISR Agency, 2012) of intelligence personnel who work within the DCGS around the clock to analyze the incoming data and synthesize it as part of the larger global intelligence picture. This could mean assisting missions in real time, archiving data to be evaluated later or to build a history of a target, or accessing and dispensing that archived information as needed (specific examples are provided in the next section). Generally speaking, analysts at DCGS are responsible for: ***processing*** the data as it comes in, ***exploiting*** whatever useful information is contained therein, and ***disseminating*** those intelligence products back to the “customers" (whoever needs the information – a soldier or marine on the ground, or an armed aircraft preparing a strike, for example).

Heavy reliance is placed on DCGS for critical, 24/7 operations.

Because the U.S. military is engaged in operations around the world 24 hours a day, 365 days a year, there is a constant need for intelligence personnel to support these operations. The intelligence analysts working in the DCGS represent a broad range of skill sets for evaluating various forms of visual, auditory, and fused (mixed visual-auditory) forms of information. Examples of specialties include imagery analysts, linguists, and network intelligence analysts. These skills are collectively needed to synthesize the multiple incoming types of information and present it to supported units in a useful, timely manner.

DCGS intelligence personnel support a wide variety of missions, including both conventional and special operations, and are involved in every step: planning, execution and evaluation. Whether locating improvised explosive devices (IEDs) on a convoy route, tracking a vehicle through heavy traffic, observing patterns of life for a person of interest, helping identify enemy targets for a kinetic strike or doing battle damage assessment, these airmen are a foundational part of the military's ISR enterprise. Furthermore, in addition to analyzing the data, they are constantly involved in coordinating and communicating with the aircraft's pilots, sensor operators, command centers, and troops "downrange." In some cases, even sensors on aircraft thousands of miles away are directly controlled from the DCGS.

While it can be very useful to have advanced instruments providing multiple types of real-time information, Lt. Gen. Deptula has aptly described the situation as "swimming in sensors and drowning in data" (Magnuson, 2010). From this ocean of data (much of it mundane), it is up to

DCGS crews to extract the critical pieces of information that can help save the lives of troops on the ground. As technology advances and tactics, techniques and procedures are improved, the invaluable capabilities of DCGS intelligence personnel will be in ever-higher demand.

Defining Burnout

The preceding section provided the background for DCGS intelligence personnel as a population of interest; this section elucidates what is meant by the term "burnout." As there can often be several different interpretations of a particular term, even within the same discipline, it is important to define how burnout is to be understood in a given context. It must first be emphasized that burnout is not to be conceptualized as a dichotomous variable; that is, a person is either burned out not burned out. Rather, burnout is better described as a continuum ranging from low to moderate to high levels of experienced feeling (Maslach, Jackson, & Leiter, 1996). For purposes of this dissertation, burnout is described by the following three dimensions: emotional exhaustion, cynicism, and professional efficacy. Higher burnout is demarcated by increased feelings of exhaustion and cynicism and reduced feelings of professional efficacy.

These dimensions are not neutral, however. Burnout is on one end of a continuum; on the other is what Christina Maslach calls engagement. "Engagement is an energetic state in which one is dedicated to excellent performance of work and confident of one's effectiveness. In contrast, burnout is a state of exhaustion in which one is cynical about the value of one's occupation and doubtful of one's capacity to perform" (Maslach et al., 1996).

Emotional Exhaustion

According to Maslach (Maslach, Schaufeli, & Leiter, 2001) emotional exhaustion "is the central quality of burnout and the most obvious manifestation of this complex syndrome." Because exhaustion is more widely reported and analyzed than the other two dimensions, some experts have argued that the other two aspects are not necessary to include as part of the conceptualization of the phenomenon (Koeske & Koeske, 1989; Shirom, 1989). However, Maslach contends that exhaustion is a necessary but insufficient criterion for burnout: it is the "basic individual stress dimension of burnout" (Maslach et al., 2001), or what one may commonly mean when describing oneself as "burned out." A person experiencing emotional exhaustion would tend to describe feeling drained or "used up" by the end of the workday.

Cynicism

People do not simply experience this kind of exhaustion in a vacuum, but will respond by trying to put emotional distance between themselves and their job. Whereas exhaustion is the personal experience of burnout, cynicism is the interpersonal – it "refers to a negative, callous, or excessively detached response to various aspects of the job" (Maslach et al., 2001). Someone experiencing cynicism would not be as interested or enthusiastic about the job as when he or she first started. The reason that cynicism continues to be conceptualized as an aspect of burnout, and not simply a possible consequence, is that the link between exhaustion and cynicism is strong and consistent across a wide range of organizations and occupations, and yet the two dimensions remain distinct (Maslach et al., 2001).

Professional Efficacy

High professional efficacy would include a sense of contributing effectively to one's organization, or having accomplished worthwhile things on the job. A person who does not feel that way is experiencing inefficacy, the "self-evaluation dimension" of burnout. This refers to "feelings of incompetence and a lack of achievement and productivity at work" (Maslach et al., 2001).

The relationship of inefficacy to exhaustion and cynicism is more complicated than the relationship of the first two aspects to each other. Sometimes it seems to be a function of either or both of the other two elements (Lee & Ashforth, 1996). Depending on the context, inefficacy sometimes seems to develop simultaneously with exhaustion and cynicism, not successively (Leiter, 1993). Another distinction is that exhaustion and cynicism tend to arise because of work overload, while inefficacy is more clearly linked to a perceived lack of resources (to include training) on the job (Maslach et al., 2001).

On the other hand, a person could perceive his or her capabilities as effective and yet still be experiencing high levels of exhaustion and cynicism; this seemed to be the case in a recent study of RPA pilots and sensor operators (Chappelle, Salinas, & McDonald, 2011). While there has been much debate over the intricacies of these dimensions[2] - their causes, effects, and interactions with each other - all three are usually involved to some degree in an individual who is experiencing what is commonly just called "burnout."

[2] For example, see Maslach, Christina, Wilmar B. Schaufeli and Michael P. Leiter. "Job Burnout." *Annual Review of Pshychology* 52:397-422. 2001.

DCGS Intelligence Personnel at Risk

It has already been shown that the DCGS is a vital part of the Air Force's intelligence operations. This alone is enough reason to warrant a rigorous examination of the psychological health of DCGS intelligence personnel, including burnout. Such an assessment is further justified by the lack of virtually any prior knowledge about this population's mental health. It may be the case that DCGS intelligence personnel have low levels of burnout and there is little reason for concern or intervention. However, there are several reasons to believe that members of this population are at particular risk for experiencing occupational burnout (i.e., high levels of emotional exhaustion, high levels of cynicism, and/or low levels of professional efficacy).

While the prior sections established the importance of the DCGS and defined burnout, this section discusses potential risk factors for burnout that apply to DCGS intelligence personnel. For purposes of conceptualization and organization, risk factors are sorted into five categories: (a) operational, (b) organizational, (c) combat-related, (d) deployed “in-garrison” and (e) demographic. These categories are consistent with a recently published study on the facets of occupational burnout among Air Force RPA operators supporting ISR operations (Ouma, Chappelle, & Salinas, 2011).

Operational Risk Factors

Operational risk factors are simply those associated with sustaining routine operations. These include manpower shift scheduling to continuously run 24/7 operations, extended working hours (more than 50 hours per week), the monotony of sifting through an endless supply of incoming real-time auditory and visual data, and maintaining constant vigilance to catch key information and respond immediately to new taskings.

Perhaps the two most intuitive operational factors that could contribute to burnout are working too hard and for too long. Both are expected from DCGS intelligence personnel due in part to manning shortages and incessant demand for information. Clearly there is some relationship between working too hard and working too long, but both factors have been individually observed in a number of populations, across all three dimensions of burnout. Studies by DePaepe et al. (1985) and Russell et al. (1987) reported that teachers with more students had higher burnout levels than those with fewer students. Pines and Kafry (1978) described a positive correlation between burnout-like symptoms (the study was conducted before the modern conceptualization of "burnout" was described) and caseload of social service providers. Among junior enlisted Army personnel, Wilcox (2000) reported that emotional exhaustion increased as hours worked per day increased. It is worth noting that over a third of the DCGS workforce is made up of junior enlisted personnel[3] (IDEAS, 2012).

Similarities between air traffic controllers and DCGS analysts may provide insight into the less-studied DCGS population. For example, both populations must sustain 24/7 operations and constantly handle large amounts of visual and auditory information from multiple sources. A considerable amount of research has demonstrated the positive link between work overload and burnout among air traffic controllers (Isaac & Ruitenberg, 1999; Zeier, 1994; Grandjean et al., 1971; Mohler, 1983; Dell'Erba et al., 1994).

Perhaps most salient to DCGS intelligence personnel are studies of the pilots and sensor operators who actually fly RPA, because the two groups' jobs share many characteristics. In a

[3] Defined as a rank of E4 (Senior Airman) and below.

recent, large study of RPA operators, McDonald and Chappelle (2010) reported higher levels of burnout compared to noncombatant airmen, and that long work hours were a key source of stress among survey respondents. This study also indicated that in some cases, DCGS intelligence personnel supporting RPA operations experience burnout at an even higher rate than the RPA operators themselves. For the same population, Ouma et al. (2011) report that work weeks of 50 hours or more were associated with increased emotional exhaustion.

While work overload and task saturation are posited to influence burnout, it has also been theorized that work "underload" (i.e. tedium and monotony) can lead to burnout (Maslach et al., 2001). In terms of overall demand, DCGS intelligence personnel are certainly faced with work overload, the implications of which are discussed above. However, on a day to day basis, the actual performance of PED can be very tedious and monotonous. Many hours may be spent "just staring at a rock waiting for something to happen" (Trehal, 2011). Such situations lead to cynicism and skepticism about a mission – and intelligence analysts often feel as if their time or talents are wasted on "boring" missions (Braisted, 2011).

If these feelings are dramatically different from an individual's expectations about the job, the result could be further cynicism and a reduced sense of professional efficacy (Cordes & Dougherty, 1993). Maslach et al. (2001) note that although the empirical support for this notion is mixed, some studies do seem to indicate that unmet expectations are a risk factor for burnout – even if those expectations were idealistic or unrealistic. One psychologist[4] working with RPA operators at a stateside operating base supports the notion that this disconnect occurs in the ISR world. He attributes it to a mixed message from Air Force leadership. On the one hand, personnel in the intelligence career fields are constantly reminded they are on the cutting edge of

[4] The psychologist requested anonymity for security reasons.

warfighting – an indispensable piece of the equation (for example, see remarks from (Schwartz, 2011) or ISR public affairs material). On the other hand, many ISR personnel feel that they are not always supplied with what they need in order to accomplish all they are asked to do – particularly, sufficient numbers of personnel (Braisted, 2011). This is a type of role conflict, which can be an organizational risk factor (see following section).

Organizational Risk Factors

These risk factors are associated with organizational structure, resources, policies, and interactions with leadership. Examples include unrealistic expectations from commanders, an incongruity between job duties and the quality or amount of training received, and a lack of clear or positive feedback (either from geographically distant operational units supported by DCGS operations or from local commanders) resulting in ambiguous expectations.

Role conflict exists when an individual is faced with seemingly irreconcilable demands, and increases the likelihood of burnout (Schwab & Iwanicki, 1982; Jackson, Schwab, & Schuler, 1986). Within the category of organizational risk factors, there are two types of role conflict that may apply to DCGS intelligence personnel, which would be cause for concern regarding burnout: 1) an expectation of doing more than is possible given time constraints, and 2) an incongruity between assignments and the quality or amount of training received. First, DCGS workers are often expected to "surge" to meet demands. As described earlier in this chapter (and illustrated in Figure 1.2), there has been a persistent shortage of ISR personnel below the target numbers. This means doing more with less. Wilcox (2000) quotes a senior officer whose personal experience in the army tells a similar story: "Throughout my service the demands on the army and organizations in it have often been out of proportion to the people and resources available. The army seldom adjusted goals that had been established prior to reductions in force and budget cuts…the troops and the army as an organization paid the price." While the DCGS enterprise is not currently facing budget or personnel *cuts*, it continues to face a personnel shortage, to the same effect.

The second kind of role conflict may arise as an "incompatibility between demands and abilities, as occurs when an individual is assigned a task but lacks the adequate training to perform that task" (2000). One of the consequences of the rapid increase in ISR personnel over the last few years is that the balance of the DCGS intelligence personnel has become skewed towards newcomers (Braisted, 2011). There is a relative shortage of more advanced skills and experience compared to the entry-level skill positions (Allen, 2012).[5] This means there are fewer trainers for more trainees, which could result in this type of role conflict for many DCGS intelligence personnel. Even if training is in fact adequate, it may be possible for a young enlisted airman to perceive the training and mentorship as insufficient when it is coming from an E4 or E5[6] instead of an E7 or E8.[7] As the perception of inadequate training for a given task has been linked to all aspects of burnout (Carroll, 1979; Maslach & Jackson, 1982), it is likely that at least some DCGS intelligence personnel may be more prone to burnout for this reason.

Schwab and Iwanicki (1982) described a significant relationship between role ambiguity and the burnout elements of emotional exhaustion and cynicism. Role ambiguity occurs "when a person is uncertain about role expectations in a job…about how best to perform the job, and about the criteria used to evaluate job performance" (Wilcox, 2000). This is particularly salient,

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[5] This shortage is not only due to the growth in the career field. As many as half of new airmen will leave after their first term, so they must be recruited in greater numbers to ensure enough are left to fill the higher positions as they advance.

[6] Senior Airman or Staff Sergeant

[7] Master Sergeant or Senior Master Sergeant

given that the role of DCGS intelligence personnel is often ambiguous by this definition. It may sometimes be unclear to the analysts who they are ultimately supporting, and in what way (Braisted, 2011). Furthermore, there is currently no objective measure of job performance for many DCGS intelligence personnel. Taskings and orders are often very broad, and performance reviews are similarly generic in nature (Braisted, 2011; Trehal, 2011). The difficulty in measuring job performance is due in part to the variety of tasks performed by these airmen and the lack of observable outcomes. For example, an analyst may determine by watching a live FMV feed that insurgents are placing an IED on a convoy route. The analyst then helps direct ground forces to intercept the enemy combatants. Certainly this is a positive outcome for the U.S. military, but the criteria for how the analyst should be evaluated are unclear. Formal performance reviews thus tend to be worded very generally: "[Airman Jones] supported counterinsurgency operations through processing, exploitation and dissemination of full-motion video" (Braisted, 2011).

Compounding this problem of role ambiguity is a stark lack of feedback for DCGS intelligence personnel from the units they support. Given their ubiquitous and growing role in global military operations, there is good reason to believe that these airmen do have a very positive impact on the outcome of those operations – combatant commanders' continuous requests for more PED capability is telling. However, DCGS intelligence personnel rarely hear back from supported units after a mission. When feedback does come, it is almost always focused on the negative. This can paint a misleadingly pessimistic picture in the minds of workers about their job. By contrast, even a brief complement (e.g., "Thank you for your help today – you made a difference.") can be an enormous morale boost for the entire team of analysts (Braisted, 2011; Trehal, 2011) . Research by Pines and Kafry (1978) and Maslach and Jackson

(1981) supports the notion that burnout is more likely in the absence of positive feedback. Cherniss (Cherniss, 1993) points out that a lack of feedback has particular consequences for the cynicism and professional efficacy aspects of burnout. Without confirmation of one's impact on the military mission, it would be difficult to feel like an effective contributor to the organization. On the contrary, the analyst is far more likely to doubt the significance of his or her work.

Combat-Related Risk Factors

Combat-related risk factors are those involving real-time ISR missions that provide direct support to combat operations (Ouma et al., 2011; Chappelle et al., 2011). Examples include, but are not limited to, (1) critical decision-making regarding targeting and identification of enemy combatants and assets in which mistakes may come at a high price (e.g., inadvertently killing civilians or friendly ground forces), (2) responsibility for providing timely, accurate information for force protection of ground troops (e.g., potential IED emplacements or ambush sites), and (3) regular exposure to real-time video and images of death and destruction in order to conduct battle damage assessment.

It has already been established that work overload can contribute to burnout. However, this issue could be exacerbated by combat-related factors. Wilcox (2000) reports that "overload involving responsibility for the well-being of other people is especially likely to result in stress and adverse health effect." As in air traffic controllers (Kahn, 1978), this issue could reasonably be expected among DCGS intelligence personnel. The responsibility for protecting others' lives is another parallel between the two populations, in addition to RPA operators (Ouma et al., 2011; Chappelle et al., 2011).

The ability to view to death and destruction in up-close detail from a long distance away is a relative novelty for military personnel. It is unknown what effect, if any, this vicarious experience of combat has on individual burnout levels. Clues from the literature are somewhat ambiguous: secondary exposure to sexual and violent trauma was associated with higher emotional exhaustion in one group of therapists (Baird & Jenkins, 2003), but not in another (Schauben & Frazier, 1995). Such a relationship did not appear among professionals working with torture survivors (Birck, 2001), but a more recent study of military personnel did report that past experiences of personal trauma (including wartime violence) were associated with higher levels of exhaustion and cynicism (Whealin et al., 2007). In developing a new scale to assess vicarious combat exposure, Prince (2011) found that DCGS intelligence personnel experienced twice the combat exposure as support personnel in the same location. It is unclear whether those with primary or secondary traumatic exposure are more analogous to DCGS intelligence personnel, but seems possible that this aspect of analysts' work could be related to occupational burnout.

Deployed in Garrison Risk Factors

Advances in satellite communications and network technologies have allowed DCGS intelligence personnel to participate in global ISR operations from within the borders of the United States. When an airman deploys overseas, he is not expected to be around or available to help with domestic duties. His or her daily life is driven by the demands of a 24/7 operational environment, and the individual is fully available to meet those demands without the added responsibilities presented by a family or a peacetime/training environment. Deployed airmen are free from many of the administrative tasks they face at a stateside base; or at least, they are supported by base operations that understand the demands of deployment (e.g., extended hours of operation for the finance office or medical clinic). By contrast, DCGS intelligence personnel are "deployed in garrison," which means that although they are participating in 24/7 combat operations, they are also expected to fulfill their administrative and home duties. This unique situation constitutes a potential risk factor for burnout.

Two types of role conflict are discussed above in the context of organizational risk factors. A third type of role conflict is related to being deployed in garrison: the incompatibility between responsibilities at home and responsibilities at work, and as the incompatibility between mission-related work responsibilities and administrative work responsibilities. When working extended shifts at odd hours, DCGS intelligence personnel may find it extremely difficult to complete domestic tasks such as updating financial information, making a dental appointment, picking up a child from daycare, or any number of other challenges they do not face when overseas.

Airmen on traditional deployments know that they are not going to see their family for weeks or months at a time. Though they can go home between shifts, airmen who deploy in garrison may have unrealistic expectations about how much time they will actually get to spend time with their families (Trehal, 2011). Changing shift schedules and long hours could prove a disappointment in this regard. These unmet expectations can quickly lead to feelings of cynicism, as described above – especially because the operational tempo never slackens. While there is a definite end to any physical deployment, many airmen in the DCGS have been supporting combat operations for three or more years without a break. It has been described as “seeing the light at the end of the tunnel, but the tunnel keeps getting longer” (Trehal, 2011). Of course, airmen without families may face their own challenges.

Demographic Risk Factors

Clearly, family relationships have the potential to play some role in burnout, whether positive or negative. Studies of police officers (Burke, 1988), nurses and engineers (Bacharach, Bamberger, & Conley, 1991) found higher levels of work interfering with family obligations were significantly related to burnout. Inversely, Leiter (1990) as well as Maslach and Jackson (1982, 1985) describe how positive family influences may actually ameliorate burnout. One study observed a consistent pattern of lower burnout for married individuals than for non-married, but far more significant was the positive effect of having one or more children. In fact, "childless employees showed more burnout on all aspects of [burnout]" (Maslach & Jackson, 1985). This relationship is also supported by Ahola et al. (2008), who found decreased burnout among women in their most active family years (approximately between age 25 and 55). Because of the additional demands a family can bring, this may seem counterintuitive at first. Maslach and Jackson (1985) propose several plausible interpretations of these findings, including evidence that "love, aid and comfort provided by family members can help the individual cope more effectively with job stress."

Because of the heavy demands on intelligence personnel working within the DCGS, those with families may be more at risk for burnout. Alternatively, those without family may be more at risk. Certainly, marriage and children are likely to mean more responsibilities, but they may not necessarily mean higher burnout. Analysis of these variables' relationship to burnout should clarify the situation with DCGS intelligence personnel. Whatever the case may be, a variety of research suggests that positive family factors can mitigate burnout, while negative family factors can exacerbate it. These factors are worth examining in more detail; it is important to understand who (demographically) among the DCGS intelligence population is at particular risk of burnout so that potential interventions and resources can be targeted towards those who need it the most.

A large proportion of the DCGS intelligence population is made up of young airmen on their first tour of duty, but it is unclear whether young age is a risk factor for increased burnout. According to Maslach et al. (2001), younger employees tend to report higher levels of burnout than older employees, though this observation could be due in part to survivor bias.[8] A review by Brewer and Shapard (2004) also reported a negative correlation between age and burnout. Randall (2007) postulates that the greater maturity of older individuals helps them handle circumstances that could lead to burnout in a younger, less-mature person. However, many of the reviewed studies focus on human service workers (e.g. health care providers or educators) and are probably not generalizable to the DCGS intelligence population. In a nationally representative Finnish sample (n = 4,034) there was a differential relationship between age and burnout among men and women across all occupations (Ahola et al., 2008). For younger and older groups of female workers, the youngest and oldest, respectively, reported higher burnout. Among males, middle-aged workers reported the highest burnout. This dissertation will help determine whether the young age of many DCGS intelligence analysts puts them at greater risk for developing burnout.

Gender has not consistently been found to be associated with burnout. Maslach, Schaufeli and Leiter (2001) report the inconsistencies between various studies, as do Cordes and Dougherty (1993). Some show higher burnout for men, others for women, and others find no difference. Part of the difficulty in assessing the effect of gender on burnout is confounding with

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[8] That is, individuals who burn out early on in their careers are more likely to quit. That means older individuals still employed and taking surveys are less likely to be burned out.

other factors, such as job level. Pretty, McCarthy and Catano (1992) found no significant differences between men and women on any of the aspects of burnout when controlling for job level. It is not expected that gender alone will be associated with increased burnout among DCGS intelligence personnel.

Several categories of risk factors describe the potential for burnout issues among DCGS intelligence personnel. Table 1.1 summarizes these categories and hypothetical examples particular to this population.

Table 1.1 – Burnout Risk Factors for DCGS Intelligence Personnel

Category:	Definition:	Examples:
Operational	Associated with sustaining routine operations	• Shift scheduling • Long hours • Workload • Monotony/boredom • Unmet expectations: role
Organizational	Involving resources, training, policies, leadership	• Role conflict: workload • Role conflict: training/mentorship • Role ambiguity: leadership feedback • Lack of unit feedback
Combat-Related	Unique to supporting real-time ISR missions from the DCGS	• Targeting enemy combatants • Responsibility for protecting friendly troops • Trauma exposure to death and destruction
Deployed in Garrison	Balancing warfighter role with “normal” life	• Role conflict: work-home balance • Role conflict: work-work balance • Unmet expectations: family
Demographic	Family, age, gender, etc.	• Marriage • Children • Young age (possible)

Adverse Effects of Burnout on the DCGS Mission

It is clear that DCGS intelligence personnel provide critical support to a wide range of military operations, but in doing so are exposed to a number of potential risk factors for occupational burnout. Increased levels of burnout could adversely affect the ability of DCGS intelligence analysts to fulfill their duties, and thus mission completion would be compromised. Three issues are mentioned below, though only one will be examined further in this dissertation. The first two issues – negative health outcomes and reduced performance – are briefly presented here as additional motivation to study burnout in the DCGS community. The third issue is the negative effect of burnout on retention.

Burnout is associated with a wide array of negative health outcomes.

In addition to being related to burnout, many of the same risk factors for burnout discussed above could have consequences for other areas of physical or mental health. Consider, for example, the physical toll on the body taken by switching back and forth between day shifts and night shifts. Although this dissertation will not consider health symptoms directly, Kahill's summary of health symptoms associated with burnout is worth mentioning (1988). Numerous physical symptoms have been associated with increased burnout both qualitatively and quantitatively, including fatigue, physical depletion, sleep difficulties, headaches, gastro-intestinal disturbances, colds and flu. Many of these symptoms are interrelated, with each other and with burnout, so it would be difficult to pinpoint the effect of burnout on any particular physical health symptom (or vice versa). Other studies examined the effects of fatigue and shift work (though not burnout as defined here) on performance and health among RPA operators, whose jobs share many characteristics with DCGS intelligence personnel (Rash, LeDuc, & Manning, 2006; Tvaryanas & Thompson, 2006; Tvaryanas et al., 2006; Tvaryanas et al., 2008; Tvaryanas & MacPherson, 2009; Ouma et al., 2011). Again, though the direct linkage between many of these symptoms and specific dimensions of burnout are often tenuous, the potential effects merit consideration. Kahill (1988) goes on to describe the many negative emotional, behavioral, interpersonal and attitudinal symptoms that have been related to burnout in numerous studies and populations. Any of these connections would be worth further study to try and optimize all aspects of DCGS intelligence analysts' personal health.

Burnout leads to reduced performance.

Maslach et al. (2001) report that burnout "leads to lower productivity and effectiveness at work." For DCGS intelligence analysts, this might mean, for example, an inability to analyze all the assigned images in a given time frame. Taris (2006) conducted a meta-analysis of studies exploring the relationship between burnout and objective performance data, such as supervisor reports. He concluded that exhaustion and cynicism were negatively related to performance, but no evidence that inefficacy alone led to decreased performance.

One of these studies (Van Der Linden et al., 2005) found that the level of burnout was "significantly related to the number of cognitive failures in daily life…and difficulties in voluntary control over attention." Cognitive failure for a DCGS intelligence analyst might mean accidentally misreporting data to a supported unit, or neglecting to catch key pieces of information from incoming video feeds.[9] Though the generalizability of some of these studies to the DCGS intelligence population is questionable, even the potential for performance problems makes them worth some examination.

Studies of RPA operators are likely more generalizable to the DCGS intelligence population. Two such studies on managing multiple unmanned sensor platforms simultaneously established a link between stress and impaired performance (Sterling & Perala, 2007; Dixon, Wickens, &

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[9] These examples are hypothetical, not evidence that such incidents have occurred in any DCGS unit.

Chang, 2005). This research suggests there is a limited amount of responsibility an individual can handle before performance is adversely affected, and should be considered because of the aforementioned link between job overload and burnout. More broadly, Hossain et al. (2004) and Folkard and Tucker (2003) report on the negative effects of shift scheduling on safety and performance across a variety of populations. This dissertation explores how shift scheduling and burnout may be related.

In order to do their job well, countless military operations and personnel rely on DCGS intelligence analysts every day. It is critical these analysts function at their best level of performance because lives depend on it. Even a momentary lapse in vigilance could lead to a crucial missed piece of intelligence. The link between increased levels of occupational burnout and reduced performance is thus a compelling reason to study burnout in DCGS intelligence personnel.

Burnout is linked with reduced retention.

Certainly there are numerous factors that an individual considers before leaving a job, and military members are more limited than civilians because of the term of service to which they committed. At some point though, each intelligence analyst working in the DCGS will be faced with a choice to either remain in the Air Force or separate. Because occupational burnout is something that commanders can possibly work to mitigate, it would be useful to know the extent to which burnout plays a role in decisions about retention. Wilcox (2000) summarizes a number of studies that associate increased burnout with a greater desire to change jobs (Pines & Kafry, 1978; Maslach & Jackson, 1982; Albrecht, 1982; Weinberg, Edwards, & Garove, 1983). Leiter and Maslach (1988) describe how high levels of burnout lead to a decrease in organizational commitment. Cropanzano et al. (2003), Lee and Ashforth (1996), and Harrington et al. (2001) specifically link burnout to increased turnover intentions. Kahill (1988) reviews several more studies supporting this relationship. Turnover intentions matter, as Hosek and Martorell (2009) demonstrate a positive link between intentions to reenlist and subsequent reenlistment behavior.

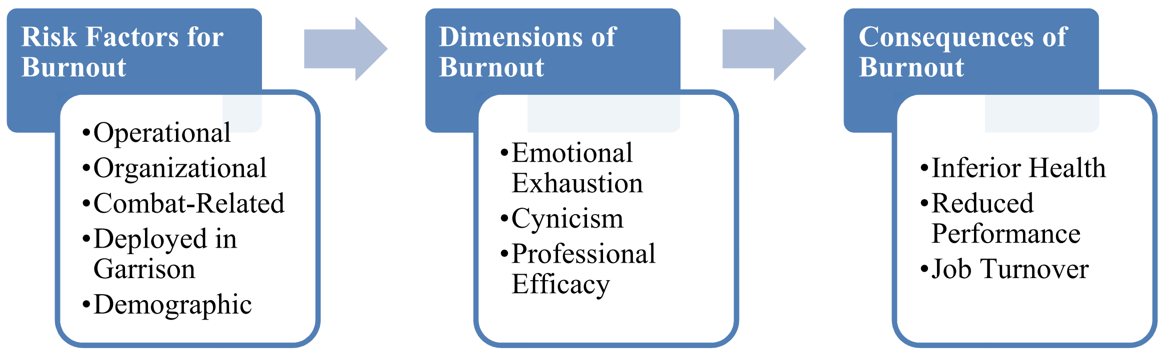
This chapter has already demonstrated the shortfall of trained ISR personnel facing the Air Force. In addition to filling the gap by increasing accessions, it is important to ensure the career field does not experience excessive turnover. This is not only key to ensuring that manpower levels are sufficient to meet mission requirements, but also that enough experienced personnel will be available to train and mentor a growing population of younger airmen. If Air Force leadership can take steps to ameliorate burnout of DCGS intelligence personnel, there is a possibility that they will not only retain more people, but experience and capability as well. Without addressing burnout, the Air Force could lose many of its trained personnel as soon as they are eligible to separate. Should this happen, USAF leadership managing the DCGS will be unable to meet the growing demand for PED capabilities, leaving their supported units to do without.

Summary

Due to the constantly growing demand for DCGS intelligence analysts, the critical nature of their mission, sustained 24/7 operations and manpower shortages, concerns have been raised about occupational burnout. The three dimensions of the burnout phenomenon have been studied in a variety of other populations, but it is unknown whether insights gained from these studies are applicable to DCGS intelligence personnel. While several studies have examined burnout in other military populations, studies of this population are new territory. This dissertation will help contribute to the growing literature on this important topic by determining whether previous observations about burnout hold true in this population.

This chapter discussed various risk factors for occupational burnout, the nature of burnout, and potential consequences of burnout. Figure 1.3 is visual representation of the process described above.

Figure 1.3 – Understanding Burnout among DCGS Intelligence Personnel



Maintaining or improving individual health, optimal performance, and sufficient manpower is of paramount importance when it comes to operating the DCGS. As such, all three are vital issues for the national security of the United States. Because they are all influenced in part by occupational burnout, it is first necessary to understand the range and severity of burnout experienced by airmen working in the DCGS. To that end, the remainder of this dissertation will be dedicated to answering the research questions elucidated at the beginning of this chapter.

Chapter 2 explains the study methodology: recruitment and sampling of participants, measures, and planned analyses. Chapter 3 presents the results of those analyses. Finally, Chapter 4 concludes with a discussion of the results and makes recommendations to Air Force leadership concerning the mitigation and effects of occupational burnout among DCGS intelligence personnel.

Chapter 2. Methodology

Study Design

As stated in Chapter 1, the research goals of this dissertation are to examine sources of occupational stress, prevalence of burnout, risk factors for burnout and turnover intentions among Air Force DCGS intelligence personnel. This dissertation employs secondary analyses of cross-sectional data collected by the USAF School of Aerospace Medicine (USAFSAM) in June 2011. Both qualitative and quantitative approaches were used in order to answer the research questions outlined in Chapter 1. This chapter describes the recruitment procedures, sample, measures and an overview of the statistical analyses.

Recruitment and Sample

The target population was 1,060 active-duty airmen assigned to units that are part of DCGS operations, consisting of both personnel in intelligence-related career fields (e.g., geospatial analysts, cryptologic linguists) and support personnel in non-intelligence career fields (e.g., communications or cyberspace operations). These particular units are based at a single major stateside military installation (hereafter “Base X”).

Personnel at USAFSAM approached wing leadership at Base X directly about participating in the research effort in late 2010. As the wing commander and several subordinate commanders were already interested in the subject, they were supportive of the survey. The survey was developed in early 2011 by USAFSAM research personnel with collaboration from medical personnel at Base X. In addition to demographic questions and standardized scales of interest to the USAFSAM team and wing leadership, a number of items were included on the survey based on input from medical staff. The survey was pre-tested in March and April 2011 by senior leadership at Base X, study directors and support staff, and several points of contact within the target population.

A formal recruitment letter was provided to wing leadership to serve as an invitation to participate in the study. This letter was passed through command channels to individual units, though intermediate commanders had discretion over what method they used to disseminate the invitation. No one in the population of interest was excluded from participating in the survey; all 1,060 airmen were invited. Because the invitation came through command channels, it was important to ensure that prospective participants knew the survey was voluntary. The recruitment message provided to commanders by the study team strongly emphasized the survey was both voluntary and anonymous. No one would be able to tell whether an individual had completed the survey or not, and no effort would be made to identify respondents. No incentive was offered for participation, but an explanation of the goals and anticipated benefits of the research was provided to airmen. Commanders promoted participation to better understand the current levels and types of occupational stress within their units, and to identify areas for change that could lead to improvements in health and morale.

The survey was administered via the Internet at the Survey Monkey website starting in late May 2011, and was available through the end of June. All airmen were provided with a link via email. No other method of taking the survey was made available. The survey was designed to take less than 15 minutes to complete at their workstation, so most individuals would not have trouble completing the survey either during work hours or on their own time, if they desired to participate. Because certain work environments in the DCGS may not have unclassified computers with internet access available, some airmen would have had to take the survey after duty on a personal computer.

The USAFSAM team sought to achieve a minimum 30% response rate from each of three squadrons at the base. However, as the aggregate distribution of Air Force Specialty Codes (AFSCs; i.e., career field) was fairly even across the three squadrons, an overall response rate of 30% would have been acceptable. Because the study aims are oriented around career field type and burnout, only respondents who reported their AFSCs and completed the burnout measure could ultimately be included in the analyses.

Throughout the period when the survey was available, the USAFSAM research team provided an up-to-date response rate to unit commanders, who were aware of the desired response rate. It was left up to the commanders to encourage their units as a whole to meet the 30% target. However, because participation was anonymous, non-participating airmen could not be individually identified and unduly pressured to take the survey against their will.

The voluntary and fully informed consent of participants was obtained in accordance with 32 CFR 219 (Code of Federal Regulations for Title 32 [National Defense], on Protection of Human Subjects) and AFI 40-402 (Air Force Instruction on Protection of Human Subjects in Biomedical and Behavioral Research). The first page of the survey website was a research consent form that explained the goals, benefits, risks, and mitigating factors. By clicking the link to proceed with the survey, a participant was granting informed consent. Participants were provided with contact information for members of the research team at the beginning and end of the survey.

The purpose and methodology of the study were reviewed and granted exemption from Institutional Review Board (IRB) oversight by the Air Force Research Laboratory (AFRL) IRB and assigned protocol number FWR20110070E. The purpose and methodology particular to this dissertation were additionally determined by RAND's Human Subjects Protection Committee (HSPC) to be exempt from HSPC review and assigned study number 2011-0672.

Measures

Each measure falls under one of the three the categories illustrated in Figure 1.3: potential risk factors for burnout, facets of burnout, and consequences of burnout. Each measure is described by type below.

Measuring Potential Risk Factors for Burnout: Demographic and Occupational Variables

Participants were asked to answer a number of demographic items: age, gender, marital status, and how many children are living at home. Using the categorical responses for age, the variable "Young" was created to represent those participants aged 25 and younger. Additional variables were generated for "Female," "Married," (vs. unmarried) and "Children at Home."

The survey also asked several work-related questions: AFSC, rank, years of military service, time assigned to current duties, usual work schedule (i.e., day, mid, night, or rotating at least one per month), number of hours worked per week, frequency of physical training, and whether the respondent works in a supervisory position.

If a respondent's AFSC indicated an intelligence-related career field (e.g., 1N1 – Imagery Analyst), the respondent was grouped into "intelligence personnel" (or simply "intel"). If the AFSC did not indicate an intelligence-related career field (e.g., 3D0 – Cyber Systems Operations), the respondent was categorized as "non-intelligence personnel" (or "non-intel").

Additional variables were created from the work-related items. Based on training and experience for intelligence analysts new to DCGS operations (Prince, 2012), "Inexperienced" refers to those who have been assigned to their current duties for 12 months or less. "Abnormal Shift" applies to anyone who described their usual work schedule as anything other than a day shift – early morning until late afternoon. As the other schedule options did not represent an ordinal continuum, this variable was created to distinguish those whose bodies are essentially operating on a normal schedule from those whose circadian rhythms are disrupted in some way by their work schedules.

"High Hours" is used to designate a work week of greater than 50 hours. During "Steady State" operations, intelligence analysts are limited by Air Force policy to working 144 mission hours per month, plus time for any administrative tasks that may be necessary (Braisted, 2011). "Extended Operations" increases the mission hour limit to 192 per month, while "Surge" and "Wartime Surge" increase the limit to 240 and 300 hours, respectively. Working more than 50 hours per week corresponds to an "Extended Operations" tempo, though depending on the administrative (non-mission hours) burden, it could represent a "Surge" tempo. Physical training was reported as the weekly frequency of exercising for at least 20 minutes – never, 1-2 times, 3-4 times, 5-6 times, or daily. Finally, participants were asked to write down their top three sources of stress affecting performance.

Measuring Facets of Burnout: Exhaustion, Cynicism, and Professional Efficacy

The primary component of the survey was the Maslach Burnout Inventory-General Survey (MBI-GS). Originally developed to measure the burnout experienced by professionals working in the human services, the earlier Maslach Burnout Inventory-Human Services Survey focuses on an individual's relationship with the people directly served as part of the job. The MBI-GS version was developed in 1996 for use with workers in other occupations, and focuses on individuals' relationships to their work in general.

Consistent with the multi-dimensional construct of burnout discussed in Chapter 1, the MBI-GS is comprised of 16 self-administered items spread across three subscales: Exhaustion (five items), Cynicism (five items), and Professional Efficacy (six items). The items themselves are copyrighted and may not be republished here (see Chapter 1 for a more detailed explanation of these three aspects of burnout). Each item on the scale consists of a statement of feeling. Respondents were asked to rate how often each statement is true for them, according to the following scale:

Table 2.1 – MBI-GS Item Ratings (Maslach 1996)

Score	Explanation
0	Never
1	Sporadic - a few times a year or less
2	Now and Then - once a month or less
3	Regularly - a few times a month
4	Often - once a week
5	Very Often - a few times a week
6	Daily

Confirmatory factor analyses for the MBI-GS were initially conducted by Schaufeli, Leiter, and Kalimo (1995), based on samples across different settings, occupations, and countries. These included Dutch civil servants and rural workers, Finnish computer workers, and Canadian military personnel, clerical workers, technologists, nurses, managers, and psychiatric workers. The original 28 items were reduced to 16, and the three-factor structure was corroborated in each sample. Since its development, the three-factor structure of the MBI-GS has been repeatedly validated in numerous studies from different countries and occupational groups (Schaufeli, Leiter, & Kalimo, 1995; Schutte et al., 2000; Storm & Rothmann, 2003). For the large Canadian sample referenced above (n = 3,727), the subscales had the following Cronbach Alphas: Exhaustion: 0.89; Cynicism: 0.80; Professional Efficacy: 0.76.

In accordance with the literature, the 16 items of the MBI-GS were scored across the three subscales of Exhaustion, Cynicism and Professional Efficacy. There is no total score for burnout; respondents are given three scores. Subscale scores are determined by summing the individual scores for each item within that subscale. For example, the score for Exhaustion is determined by adding the scores for the five Exhaustion items. An individual experiencing a high degree of burnout would be one who scores high on the Exhaustion and Cynicism subscales (ranging from 0-30), and low on the Professional Efficacy subscale (ranging from 0-36). The inverse is true for someone experiencing a low degree of burnout; an average degree of burnout would be indicated by average scores on all three subscales. Note that there is no need to reverse score Professional Efficacy, because it stands alone as its own score; rather, the meaning of a high or low score is simply interpreted inversely from Exhaustion and Cynicism.

While it is typical in the literature for subscale scores to then be reported as an *average* item score, summed scores are reported here. This is to aid in interpretation – a summed score can easily be understood as compared to the scale minimum, maximum, or mean. Table 2.2 reports the categorization of MBI-GS scores based on Schaufeli et al.'s, (1995) normative sample from Canada (n = 3,727) – modified to show summed scores rather than average scores.

Table 2.2 – Categorization of MBI-GS Subscale Scores in Large (n = 3,727) North American Sample (Modified from Maslach 1996)

	Range of Experienced Burnout by Tertiles		
MBI-GS Subscales	**Low Burnout (lower third)**	**Average Burnout (middle third)**	**High Burnout (upper third)**
Exhaustion (5 items; scored 0-30)	≤10	10.01–15.99	≥16
Cynicism (5 items; scored 0-30)	≤5	5.01–10.99	≥11
Professional Efficacy (6 items; scored 0-36; interpreted inversely)	≥30	24.01–29.99	≤24

This study uses more conservative cutoffs than the normative tertiles to define a high (or low) score on a given subscale, as shown in Table 2.3. These cutoffs are consistent with prior and current studies of burnout conducted by USAFSAM in other Air Force sub-populations (e.g., Chappelle, Salinas & McDonald, 2011).

Table 2.3 – Cutoff Scores for Defining an Individual as Reporting High Exhaustion, High Cynicism, or Low Professional Efficacy

	High Exhaustion	High Cynicism	Low Professional Efficacy
Subscale Score	≥20	≥20	≤12

For the five items on either the Exhaustion or Cynicism subscales, a score of 20 or greater indicates that an individual endorsed each subscale item as occurring, on average, once a week (item score = 4). While some items may not be endorsed as highly, an individual experiencing all or some of these feelings every week could reasonably be considered highly exhausted, or highly cynical. Indeed, such scores would be greater than those in the top tertile of a much more general population. Similarly, a score of 12 or below on the Professional Efficacy subscale can be understood to mean that, on average, the respondent only agrees with the six items describing positive professional efficacy once a month or less (i.e., they infrequently feel efficacious). Considering that the third of the general population experiencing the lowest levels of professional efficacy score 24 or below, individuals scoring 12 or below can reasonably be described as having low levels of professional efficacy. Again, a greater degree of burnout is to be conceptualized by higher exhaustion, higher cynicism, and lower professional efficacy.

Measuring Consequences of Burnout: Turnover Intentions

Respondents were asked how strongly they agreed with the statements "I plan to continue serving in the USAF" and "I plan to continue in my current career field." Both of these questions were scored on a continuous scale, ranging from 1(completely false) to 10 (completely true).

Summary of Measures

Table 2.4 summarizes how each measure is operationalized for analysis. Rank and years of military service were ultimately excluded due to a high correlation with each other and with age. Furthermore, neither variable had any basis in the literature as a potential risk factor for burnout.

Table 2.4 – Summary of Variable Definitions Used for Analysis

Variable Name	Operational Definition
Intel	1 if AFSC is an intelligence career field *0 otherwise*
Young	1 if age is under 26, non-inclusive *0 otherwise*
Female	1 if female *0 otherwise*
Married	1 if married *0 otherwise*
Children at Home	1 if dependent children are living at home *0 otherwise*
High Hours	1 if more than 50 hours per week *0 otherwise*
Abnormal Shift	1 if usual work schedule is other than early morning to late afternoon *0 otherwise*
Supervisor	1 if in a supervisory position *0 otherwise*
Low Experience	1 if assigned to current duties for 12 months or less *0 otherwise*
Physical Training	Rate 1-5: perform physical training each week for at least 20 minutes *1 = never* *2 = 1-2 times/week* *3 = 3-4 times/week* *4 = 5-6 times/week* *5 = every day*
Exhaustion	Sum of 5 MBI-GS Exhaustion items *(Range: 0-30)*
High Exhaustion	Exhaustion ≥ 20
Cynicism	Sum of 5 MBI-GS Cynicism items *(Range: 0-30)*
High Cynicism	Cynicism ≥ 20
Professional Efficacy	Sum of 6 MBI-GS Professional Efficacy items *(Range: 0-36)*
Low Professional Efficacy	Professional Efficacy ≤ 12
Continue USAF	Rate 1-10: plan to continue serving *1 = completely false* *10 = completely true*
Continue Career Field	Rate 1-10: plan to continue serving *1 = completely false* *10 = completely true*

Analysis

Qualitative and quantitative methods were used to answer the research questions. The specific statistical approaches employed for each research question are described in turn below.

1a. What are the main self-reported sources of occupational stress among Air Force DCGS intelligence personnel?

1b. Do these sources differ from those reported by support personnel at the same installation?

Survey participants were asked to write down the top three sources of stress affecting their performance. Researchers at USAFSAM used a pile sort technique to content analyze these responses. This process was first completed individually and then collaboratively to come to a consensus on the categorizations. All individual reported sources of stress (up to three per respondent) were grouped together and then sorted into sub-groups by similarity. This sorting process led to 20 different categories of stress. For example, participants reported a variety of stressors related to working long hours or dealing with shift scheduling. Another category was marital/family stress, such as complications with family care arising from inconsistent schedules, or balancing work and home life. A third category had to deal with the nature of work; this could include monotony, boredom, or having to sustain vigilance over a long period of time. A full list of response categories is provided in Chapter 3.

This dissertation evaluates the responses to determine whether the main sources of occupational stress differ by group. To ascertain the "main" sources of stress in a group, the number of individual respondents reporting a certain category of stress was counted. This count included those who endorsed one stressor of a particular category, or two or three stressors in the same category. All responses were grouped by intel and non-intel, and each count was compared between these groups.

2. Do self-reported levels of exhaustion, cynicism and professional efficacy among Air Force DCGS intelligence personnel differ from levels reported by support personnel at the same installation?

To answer this question, group-level statistics for intel and non-intel were calculated for the MBI-GS. Means and standard deviations were calculated, by group, for the total scores of the three burnout subscales: Exhaustion, Cynicism and Professional Efficacy. For each subscale, the difference between mean scores of intel and non-intel were evaluated using Student's *t*-tests. Levene's test for equality of variances was first used to determine whether equal variances could be assumed when conducting the *t*-tests.

For each test, power and effect size were also calculated. Cohen's *d*, defined as the difference between two means divided by a standard deviation for the data, was used for effect size. For a difference of means, Cohen (Cohen, 1992) defines small, medium, and large effect sizes as 0.20, 0.50, and 0.80, respectively (operationally, this defines a medium difference between means as half a standard deviation). Based on the risk factors discussed in Chapter 1, it was hypothesized that DCGS intelligence personnel would tend to report higher burnout scores than support personnel.

3a. What proportion of Air Force DCGS intelligence personnel report high levels of exhaustion, high levels of cynicism, and/or low levels of professional efficacy?

3b. Do those proportions differ among support personnel at the same installation?

As described above, high levels of exhaustion and cynicism were defined as a subscale score of 20 or greater (out of a possible 30 points; 5-item subscales), corresponding to an average item-level response of four (“Often – once a week”). Low professional efficacy was defined as scoring 12 or below on that 6-item subscale (out of a possible 36), corresponding to an average item-level response of two (“Now and Then – once a month or less”). The proportion of personnel in each group meeting each one of these criteria was determined, as well as the proportion meeting criteria for all three cutoffs.

Pearson’s chi-square tests were performed to test the null hypotheses that career field type was independent of each of the three burnout thresholds. A significant test statistic would therefore indicate that career field type was related to experiencing high burnout. Due to several small counts in the contingency tables, Yates’ correction for continuity and Fisher’s exact tests were also conducted. Odds ratios were calculated for meeting the subscale thresholds as well. Again, based on the risk factors discussed in Chapter 1, it was hypothesized that greater proportions of intelligence personnel would meet thresholds for high exhaustion, high cynicism, and low professional efficacy.

4a. Among Air Force DCGS intelligence personnel, what are the associations of demographic and occupational variables with self-reported levels of exhaustion, cynicism, and professional efficacy?

4b. Do these associations differ among support personnel at the same installation?

This research question was addressed using Ordinary Least Squares (OLS) regression modeling. Due to a small sample size, the number of independent variables that could be included in each model was limited. Priority was given to variables known to be associated with burnout based on a review of the literature, as well as consideration of the current DCGS context – specifically, the rising demand for intelligence analysis. The coefficients and significance of these variables were compared between intel and non-intel. It was hypothesized that High Hours, Abnormal Shift and Low Experience would generally be associated with increased burnout, whereas there were not specific hypotheses regarding the other occupational and demographic variables.

Six multivariate models were run as described above. Intel and non-intel groups had three models apiece: one for each of the three MBI-GS subscale scores as the dependent variable. Table 2.5 summarizes the models used for this research question.

Table 2.5 – Multivariate OLS Regression Models Used for Research Question #4

Model #	4.1a	4.1b	4.2a	4.2b	4.3a	4.3b
Dependent Variable	Exhaustion		Cynicism		Professional Efficacy	
Group	Intel	Non-Intel	Intel	Non-Intel	Intel	Non-Intel
Possible Independent Variables	High Hours, Abnormal Shift, Low Experience, Supervisor, Physical Exercise, Young, Female, Married, Children at Home					

5a. Among Air Force DCGS intelligence personnel, what is the relationship between self-reported levels of exhaustion, cynicism, and professional efficacy and self-reported intent to remain in the Air Force?

5b. Does this relationship differ among support personnel at the same installation?

Based on the literature, it was hypothesized that increased burnout would be associated with decreased organizational commitment. In these data, this would be reflected by weaker intentions to remain in the Air Force (Question #5) and/or the current career field (Question #6).

Eight multivariate OLS regression models were used to answer this research question. The dependent variable was always Continue USAF. Whereas in Question #4 the burnout scores were used as dependent variables, here they were used as independent variables. The three facets of burnout were considered together, as well as individually while controlling for additional occupational or demographic factors. These covariates were chosen using a stepwise approach[10] after adding the burnout variable to each model. In order to answer the second part of the research question, as with Question #4, the coefficients of the independent variables and covariates were compared between corresponding intel and non-intel models. Table 2.6 summarizes the models developed for Question #5.

[10] Models were specified using an entry criteria of 0.05 and removal at 0.1; also entry at 0.1 and removal at 0.15.

Table 2.6 – Multivariate OLS Regression Models Used for Research Question #5

Model #	6.1a	6.1b	6.2a	6.2b	6.3a	6.3b	6.4a	6.4b
Dependent Variable	Continue USAF							
Group	Intel	Non-Intel	Intel	Non-Intel	Intel	Non-Intel	Intel	Non-Intel
Independent Variables	Exhaustion, Cynicism, Professional Efficacy		Exhaustion		Cynicism		Professional Efficacy	
Possible Covariates	High Hours, Abnormal Shift, Low Experience, Supervisor, Physical Exercise, Young, Female, Married, Children at Home							

6a. Among Air Force DCGS intelligence personnel, what is the relationship between self-reported levels of exhaustion, cynicism, and professional efficacy and self-reported intent to remain in the current career field?

6b. Does this relationship differ among support personnel at the same installation?

The procedure employed here was identical to that used for Question #5, except the dependent variable used was Continue Career Field. Table 2.7 summarizes the models.

Table 2.7 – Multivariate OLS Regression Models Used for Research Question #6

Model #	6.1a	6.1b	6.2a	6.2b	6.3a	6.3b	6.4a	6.4b
Dependent Variable	Continue Career Field							
Group	Intel	Non-Intel	Intel	Non-Intel	Intel	Non-Intel	Intel	Non-Intel
Independent Variables	Exhaustion, Cynicism, Professional Efficacy		Exhaustion		Cynicism		Professional Efficacy	
Possible Covariates	High Hours, Abnormal Shift, Low Experience, Supervisor, Physical Exercise, Young, Female, Married, Children at Home							

Taken together, these analyses help to elucidate the driving factors of occupational burnout among DCGS intelligence personnel and determine what differences exist between intelligence personnel and non-intelligence personnel. Additionally, these analyses explore the role that occupational burnout plays in organizational commitment of DCGS intelligence personnel, as measured by intentions to remain in the Air Force and/or the current career field. Results of these analyses are reported in Chapter 3.

Chapter 3. Results

Chapter 2 described the approach used to answer the research questions posed in Chapter 1. This chapter presents the results of these analyses, addressing each research question in turn. Descriptive statistics of the study respondents and other survey measures are reported first.

Sample Description

Response Rate

Of the 1,060 active-duty airmen invited to participate in the survey, 276 completed the questionnaire from beginning to end, though some skipped certain items or sections. Because of the research aims' emphasis on burnout and intel/non-intel group differences, only those airmen who reported their AFSC and completed the MBI-GS[11] could be included in the final analysis. Two hundred and thirty-eight airmen met these criteria, resulting in an effective response rate of approximately 22.5%. This was below the targeted response rate of 30%, and the small sample size somewhat limited the proposed analyses – especially the regression modeling. The particular limitations are discussed below, and implications are addressed in Chapter 4. Nevertheless, all the analyses outlined in Chapter 2 were performed with the 238 respondents.

[11] If more than two MBI-GS items were skipped, the respondent was dropped. No data imputation was used for two or fewer missing items; only as many of the MBI-GS subscales that could be fully scored were included.

Intel/Non-Intel Group Categorization

The first step was to categorize the sample according to AFSC in order to demarcate an intel group and a non-intel group. The intel group comprises over two-thirds of the sample and includes more imagery analysts than any other AFSC (40% of the group). The non-intel group consists of everybody else who responded – mostly cyberspace-related AFSCs. Table 3.1 summarizes the respondents by group and AFSC.

Table 3.1 – Percentage of Personnel in AFSCs Representing Intel and Non-Intel Groups

Intel AFSC	% (n) of Sample	Non-Intel AFSC	% (n) of Sample
14N - Intelligence Officer	8% (18)	17D - Cyberspace Officer	<1% (1)
1N0 - Intelligence Applications	8% (18)	1B - Cyberspace Defense Operations	<1% (1)
1N1 - Imagery Analysis	27% (64)	2S0 - Materiel Management (Supply)	1% (3)
1N2 - Signals Intelligence Production	5% (13)	3C - Communication-Computer Systems	1% (3)
1N3 - Cryptologic Linguist	3% (7)	3D0 - Cyberspace Operations	9% (22)
1N4 - Signals Intelligence Analysis	16% (39)	3D1 - Cyberspace Systems	18% (42)
1N5 - Electronic Signals Intelligence Exploitation	<1% (1)	3D2 - Network Support	<1% (1)
		3E - Civil Engineer	1% (2)
		3S0 - Mission Support	<1% (1)
		8F0 - First Sergeant	<1% (1)
		9A3 - Enlisted Awaiting Discharge (beyond control)	<1% (1)
Total:	**67% (160)**	**Total:**	**33% (78)**

Summary of Demographic and Occupational Characteristics

Because several of the survey items had categorical (non-continuous) responses, additional variables (defined in Table 2.4) were generated to use in the analyses. Table 3.2 describes the sample in terms of these dichotomous variables, which are easier to interpret. The intel group had notably higher percentages of females (29% vs. 15%), airmen working long hours (24% vs. 14%) and abnormal shifts (53% vs. 26%), and individuals new to the job (61% vs. 39%).

Table 3.2 – Demographic and Occupational Variables by Intel/Non-Intel Group

Variable	Intel (n = 160)	Non-Intel (n = 78)	# of Non-Responders
Young (under 26)	43%	39%	1
Female*	29%	15%	1
Married	59%	54%	10
Children at Home	43%	38%	0
High Hours* (>50/week)	24%	14%	2
Abnormal Shift*	53%	26%	2
Supervisor	54%	49%	2
Low Experience* (<12 months)	61%	39%	2
Young (under 26)	43%	39%	1
Female*	29%	15%	1
Married	59%	54%	10
Children at Home	43%	38%	0

**Indicates notably higher percentage among intel personnel*

Physical exercise was the only assessed demographic or occupational factor not coded as a dichotomous variable. Table 3.3 summarizes the frequency of physical training reported by intel and non-intel respondents; a smaller percentage of the intel group reported exercising at least three times per week (70% vs. 87%).

Table 3.3 – Frequency of Physical Training by Intel/Non-Intel Group

Frequency of Physical Training	Intel (n = 160)	Non-Intel (n = 78)
Never	2% (3)	1% (1)
0-2 Times/Week	28% (45)	12% (9)
3-4 Times/Week	51% (80)	63% (49)
5-6 Times/Week	16% (26)	19% (15)
Daily	3% (4)	5% (4)
No Response	1% (2)	0% (0)

Summary of MBI-GS Item and Subscale Scores

In this study sample, the Exhaustion, Cynicism, and Professional Efficacy subscales had Cronbach Alphas of 0.94, 0.89, and 0.86, respectively. This validates the use of the same three subscales for this sample. The reported scores for each subscale (and thus each item) ranged from the minimum to the maximum, indicating a wide range of burnout levels. Table 3.4 provides descriptive data for MBI-GS items and each subscale.

Table 3.4 – MBI-GS Item and Subscale Summary Statistics for Full Sample

Item/Subscale*	N	Mean	S.D.
Exhaustion (EX) 1	238	2.35	1.78
EX2	238	2.69	1.86
EX3	238	2.63	1.95
EX4	238	1.70	1.85
EX5	238	2.48	1.87
Cynicism (CY) 1	237	2.10	2.13
CY2	238	2.16	2.04
CY3	238	3.24	2.10
CY4	237	1.62	1.87
CY5	237	1.56	1.95
Professional Efficacy (PE) 1	238	4.76	1.65
PE2	237	3.76	1.92
PE3	235	4.83	1.45
PE4	237	3.37	1.77
PE5	238	3.58	1.80
PE6	238	4.46	1.68
EX Total (α = 0.94)	238	11.86	8.31
CY Total (α = 0.89)	235	10.67	8.39
PE Total (α = 0.86)	233	24.75	7.87

**Each item score ranges from 0-6. Subscale scores range from 0-30 (EX & CY) and 0-36 (PE).*

Summary of Turnover Intentions

Turnover intentions were assessed irrespective of whether or not an individual currently had the option to leave the Air Force or current career field. When asked how strongly they agreed with the statements “I plan to continue serving in the USAF” and “I plan to continue in my current career field,” respondents’ scores ranged from one (completely false) to ten (completely true). In regards to the Air Force, a higher percentage of intel answered negatively than non-intel

(21% vs. 12%), and a lower percentage answered positively (47% vs. 66%). Regarding the career field, the differences between intel and non-intel were not as large. Figures 3.1a and 3.1b graphically represent the percentages of each group falling into negative, neutral, and positive categories.

Figure 3.1a – Percentages of Intel and Non-Intel Reporting Negative, Neutral or Positive Intentions to Remain in the USAF

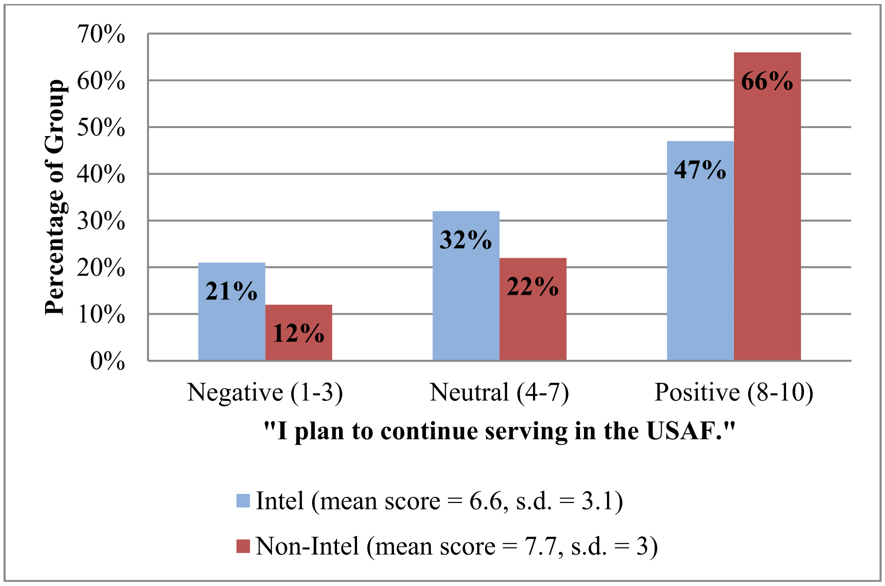
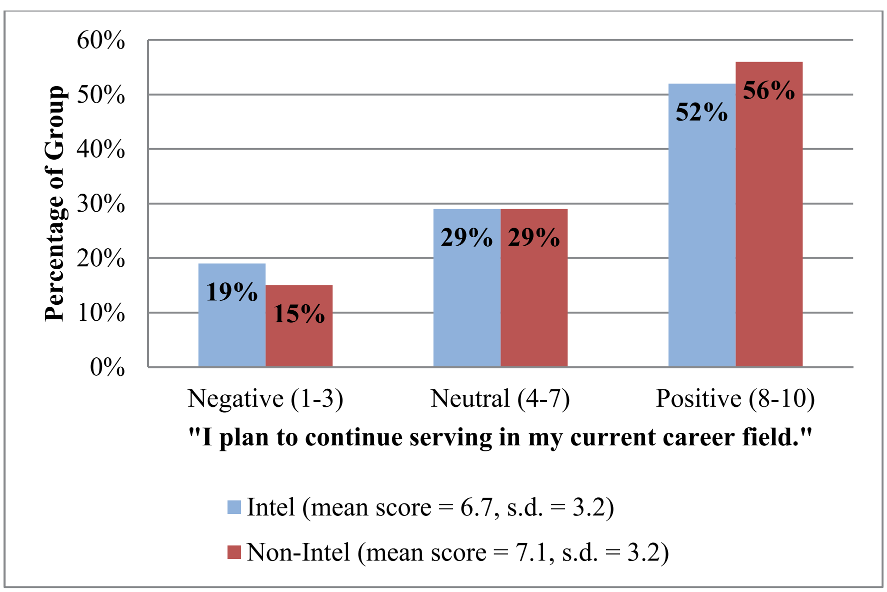


Figure 3.1b – Percentages of Intel and Non-Intel Reporting Negative, Neutral or Positive Intentions to Remain in the Current Career Field



Analytic Results by Research Question

1a. What are the main self-reported sources of occupational stress among Air Force DCGS intelligence personnel?

1b. Do these sources differ from those reported by support personnel at the same installation?

This analysis considers how many individuals reported a particular category of stress.[12] The responses will inform commanders about which stress issues intelligence personnel feel have the greatest effect on their performance, and whether these issues line up with the predicted challenges facing this group. For the intel group, the top five sources of stress were Shift Scheduling/Long Hours, Marital/Family Stressors (e.g., family care complications), Leadership Management (e.g, poor communication about goals, frequent on-the-spot tasking), Nature of Work (e.g., monotony, boredom, sustained vigilance), and Training/Mentorship. For non-intel, the top five sources of stress were Marital/Family Stressors, Shift Scheduling/Long Hours, Nature of Work, Extra Duties/Admin Tasks, and Personal Life Stressors (e.g., balancing work life with home life, unrelated to marriage).

Notably, almost 41% of intel personnel reported Shift Scheduling/Long Hours as a top source of stress. It was also a top issue for non-intel, though only 27% reported it. Higher percentages of intel than non-intel reported Training/Mentorship issues (21% vs. 6%) and Leadership Management issues (27% vs. 11%) as top sources of stress. Table 3.5 includes the full list of reported stressors and the percentage of each group experiencing that stress.

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[12] See Appendix A for a slightly different perspective on top sources of stress. When considered by frequency of stress type, the top five sources are the same, but the order is slightly different.

Table 3.5 – Percentages of Intel and Non-Intel Reporting Various Categories of Occupational Stress Affecting Performance

Stress Category	Intel (n = 125)	Non-Intel (n = 63)
Shift Scheduling/Long Hours*+	41% (51)	27% (17)
Marital/Family Stressors*+	39% (49)	41% (26)
Leadership Management*	27% (34)	11% (7)
Nature of Work*+	25% (31)	22% (14)
Training/Mentorship*	21% (26)	6% (4)
Extra Duties/Admin Tasks+	19% (24)	21% (13)
Personal Life Stressors+	18% (23)	16% (10)
Sleep Issues	16% (20)	8% (5)
Manning	15% (19)	14% (9)
Organizational Work-Related Problems	11% (14)	10% (6)
Financial	10% (13)	6% (4)
Personal Health	8% (10)	2% (1)
Deployment	6% (8)	2% (1)
Dual Military Member Challenges	5% (6)	5% (3)
PT Testing	5% (6)	5% (3)
PCS/Outprocessing	4% (5)	5% (3)
Geographic Location	3% (4)	3% (2)
Work Facility	2% (3)	2% (1)
Access to Base Resources	2% (2)	0% (0)
Death in the Unit	0% (0)	2% (1)

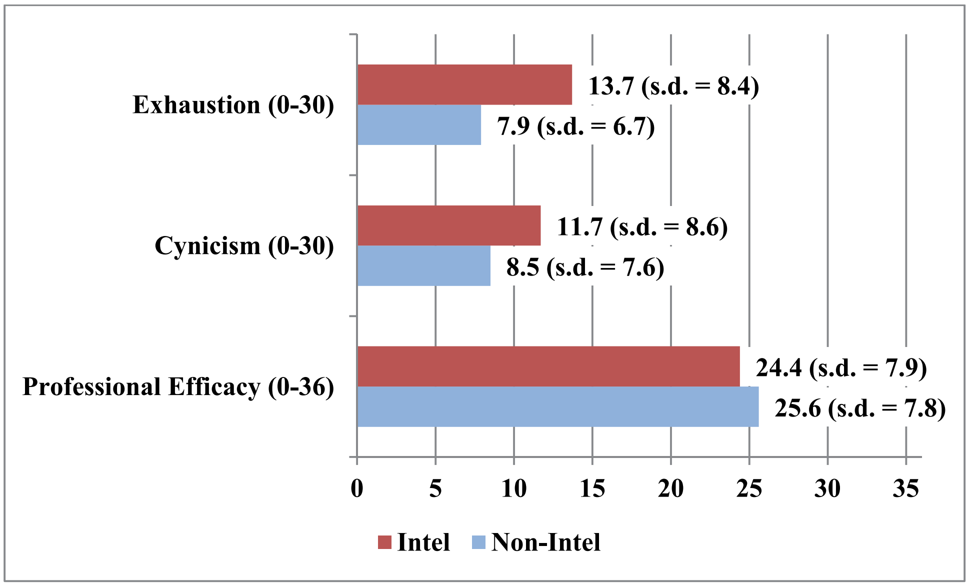
**Top five for Intel; +Top five for Non-Intel*

2. Do self-reported levels of exhaustion, cynicism and professional efficacy among Air Force DCGS intelligence personnel differ from levels reported by support personnel at the same installation?

As described in Chapter 1, there is a hypothetical basis for concern about burnout among DCGS intelligence personnel in particular. The answer to this research question will give commanders an empirical basis for that concern. The mean burnout subscale scores are shown in Figure 3.2. The intel group reported significantly higher levels of Exhaustion (13.7 vs. 7.9, p <

.01) and Cynicism (11.7 vs. 8.5, $p < .01$), while the difference between levels of Professional Efficacy was not statistically significant. One intel airman did not complete the Cynicism subscale, and three did not complete the Professional Efficacy subscale. Two non-intel airmen did not complete each of these, and one did not complete the Exhaustion subscale.

Figure 3.2 – Mean Burnout Subscale Scores of Intel and Non-Intel Groups



**Difference significant at <0.01 level*

To determine whether or not equal variance could be assumed when conducting the t-tests for difference in means, Levene's Test for Equality of Variances was used. This test indicated that equal variance could be assumed for intel/non-intel Cynicism and Professional Efficacy scores, but not for Exhaustion scores (See Table 3.6).

Table 3.6 – Levene's Test for Equality of Variances of Intel/Non-Intel Burnout Subscale Scores

	F	Sig.	Result
Exhaustion	7.46	>0.01	Assume unequal variance
Cynicism	2.61	0.11	Assume equal variance
Professional Efficacy	>0.01	0.97	Assume equal variance

Table 3.7 summarizes the t-tests for the null hypotheses that the differences between intel and non-intel burnout scores were not significant. Cohen's *d* indicated that there was a large effect size for Exhaustion and a moderate effect size for Cynicism. The test for Exhaustion also had the most statistical power, at virtually 100%. That is, the probability of a Type II error in this instance was essentially zero. The null hypothesis that there is no difference between the mean Exhaustion scores of the intel personnel and the non-intel personnel was firmly rejected.

The next-most powerful test (0.81) was that for the Cynicism scores. Here the probability of incorrectly rejecting the null hypothesis was approximately one in five. The test for equality of mean Professional Efficacy scores had a high risk of a Type II error (0.8), and a negligible effect size.

Table 3.7 – Equality of Means t-tests for Intel/Non-Intel Burnout Subscale Scores

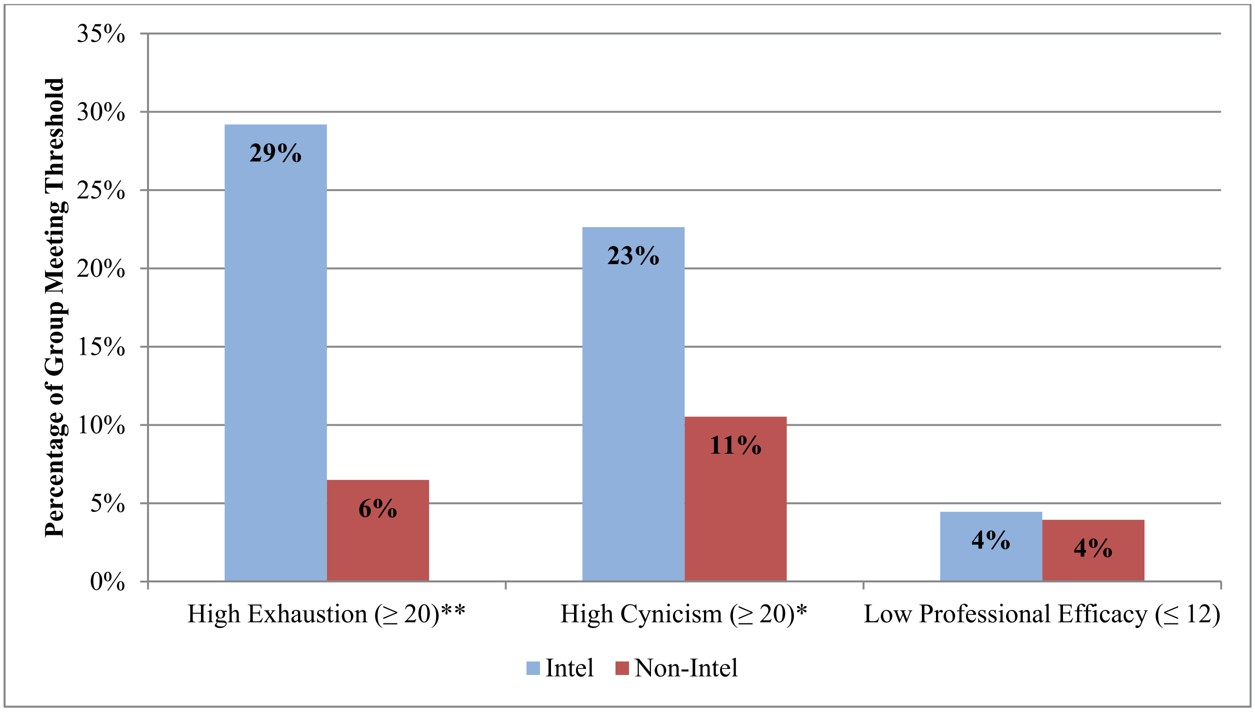
	Difference	t	D.F.	Sig.	Cohen's *d*	Power
Exhaustion	-5.84	-5.80	183.88	<0.01	0.77	1.00
Cynicism	-3.23	-2.80	233.00	<0.01	0.40	0.81
Professional Efficacy	1.23	1.12	231.00	0.26	0.16	0.20

3a. What proportion of Air Force DCGS intelligence personnel report high levels of exhaustion, high levels of cynicism, and/or low levels of professional efficacy?

3b. Do those proportions differ among support personnel at the same installation?

Regardless of whether career field groups experience different levels of burnout, it is important for commanders to have an idea of how many of their airmen are experiencing severe levels of burnout. High burnout thresholds for each MBI-GS subscale were defined as scoring 20 or above for Exhaustion or Cynicism (out of a possible 30), and 12 or below for Professional Efficacy (out of a possible 36). As illustrated in Figure 3.3, a significantly greater proportion of intel personnel than non-intel personnel met the thresholds for High Exhaustion (29% vs. 6%, $\chi^2 = 15.72$, $p < 0.01$) and High Cynicism (23% vs. 11%, $\chi^2 = 4.97$, $p < 0.05$). Approximately 4% of both groups were at or below the threshold for Low Professional Efficacy.

Figure 3.3 – Proportions of Intel and Non-Intel Personnel Meeting High Burnout Thresholds



**Significant at <0.05 level; **Significant at <0.01 level*

Pearson's chi-squared tests were conducted to test the null hypotheses that career field group is independent of each of the three burnout thresholds. Due to several very small counts in the contingency tables[13] (e.g., only three non-intel respondents met the threshold for low Professional Efficacy), Yates' correction for continuity and Fisher's exact tests were also conducted. The results from all analyses were consistent: test statistics for Exhaustion and Cynicism were significant (therefore, the null hypotheses were rejected) at the 0.01 and 0.05 level, respectively. Test statistics for Professional Efficacy were not significant in any case. Table 3.8 presents the results of these tests.

[13] Contingency tables (crosstabs) are included in Appendix A.

Table 3.8 – Chi-squared and Exact Test Statistics for Proportions of Intel and Non-Intel Personnel Meeting Thresholds for High Burnout (n = 238)

	Exhaustion		Cynicism		Professional Efficacy	
	Stat.	Sig.*	Stat.	Sig.*	Stat.	Sig.*
Pearson's Chi-Square	15.72	<0.01	4.97	0.03	0.03	0.86
Yates' Continuity Correction	14.42	<0.01	4.20	0.04	<0.01	1.00
Fisher's Exact Test	N/A	<0.01	N/A	0.03	N/A	1.00

**2-sided asymptotic significance for Pearson's and Yates'; 2-sided exact significance for Fisher's*

The percentage of airmen in each group simultaneously meeting all three thresholds was also calculated. Among intel personnel, four airmen (< 3%) reported Exhaustion and Cynicism scores of 20 or above and a Professional Efficacy score of 12 or below. Among non-intel personnel, no respondents met the thresholds for all three facets. This difference between groups could not be evaluated for significance due to the small numbers. Though four airmen represent a very small fraction of the overall sample, it is important to note that there are some individual airmen who are experiencing high levels of occupational burnout in all of its aspects.

Odds ratios[14] reveal that airmen in intelligence-related career fields were nearly six times more likely to report high levels of exhaustion than non-intel airmen, and 2.5 times more likely to report high levels of cynicism. Neither group was likely to report significantly lower levels of professional efficacy than the other.

[14] A table of odds ratios is included in Appendix A.

4a. Among Air Force DCGS intelligence personnel, what are the associations of demographic and occupational variables with self-reported levels of exhaustion, cynicism, and professional efficacy?

4b. Do these associations differ among support personnel at the same installation?

Commanders cannot control many of the factors that influence burnout. The answer to this research question will help commanders understand where they can most effectively mitigate burnout through policy decisions, and where they are limited to simply a better understanding of burnout risk factors. Ordinary Least Squares regression models were run with High Hours, Abnormal Shift, Low Experience and Young as the independent variables, and each burnout score as the dependent variable, for both intel and non-intel. These variables were chosen based on their hypothetical relationships to burnout established in Chapter 1, especially as they might be expected to apply in the DCGS context of rising demand for analysis.[15] Due to the small sample size, no more than four variables were used as predictors in a given model. These models are summarized in Table 3.9.

In terms of Exhaustion, all independent variables were statistically significant at the 0.05 or 0.01 level for the intel group, though only Low Experience was significant for non-intel. High Hours and Abnormal Shift were associated with increased Exhaustion, which was predicted by the literature. Contrary to the hypothesis, Low Experience was associated with decreased Exhaustion. Young was also associated with decreased Exhaustion.[16] For both intel and non-

[15] See Appendix A for a different approach to model specification. Rather than evaluate specific, literature-based hypotheses, a stepwise approach was employed to try and account for the most variability in burnout scores based on the available data.

[16] Low Experience and Young were not correlated more than 0.02. Many airmen now working in the DCGS cross-trained from other career fields (and were therefore inexperienced but not necessarily young). Additionally, many

intel, working an Abnormal Shift was significantly associated with increased Cynicism. It was also associated with decreased Professional Efficacy (i.e., increased burnout) among intel personnel. Both of these relationships are consistent with the literature.

In the two cases where the independent variable was significant in both groups, the magnitudes of the coefficients were similar (within 0.5 points). A slightly stronger effect was observed for non-intel. More variation in Cynicism scores was explained by the non-intel model (12% vs. 5%), while models for Exhaustion and Professional Efficacy had similar R^2 values. However, in all models, most of the variability in burnout subscale score was unaccounted for by the chosen independent variables.

Table 3.9 – Model Summaries of Burnout Risk Factors

Model #	**4.1a**	**4.1b**	**4.2a**	**4.2b**	**4.3a**	**4.3b**
Dependent Variable	Exhaustion		Cynicism		Professional Efficacy	
Group	Intel (n = 160)	Non-Intel (n = 75)	Intel (n = 158)	Non-Intel (n = 74)	Intel (n = 156)	Non-Intel (n = 74)
High Hours	3.64**	3.14	-0.30	2.92	1.66	-3.22
Abnormal Shift	2.90**	2.74	4.00***	4.43**	-2.59*	1.34
Low Experience	-2.78**	-3.11**	-1.06	-2.19	-0.57	1.00
Young	-3.79***	-0.34	-0.90	-1.00	-1.90	-2.94
Constant	14.46	7.79	10.69	7.90	26.43	26.62
Model R^2	0.13	0.14	0.05	0.12	0.07	0.06

**p < 0.1; **p < 0.05; ***p < 0.01*

When interpreting the coefficients of predictor variables, it may prove helpful to consider again the burnout subscales themselves. Attained by summing several MBI-GS items, each subscale score could also be thought of as an average of how often the respondent reported feeling a certain type of emotion. For example, an Exhaustion score of 25 would correspond to

first- or second-term airmen who were under the age of 26 still had plenty time to put 12 months of service or more into their current field (thus being young but not necessarily inexperienced).

an average item-level response of "Very Often – a few times a week." Similarly, a score of 10 would represent an average item-level response of "Now and Then – once a month or less" (see Table 2.1 for scoring information).

Consider a specific example about Exhaustion from Table 3.9. High Hours had a coefficient of 3.64, and Young had a coefficient of -3.78. All else being equal, an airman over the age of 25 facing a 51+ hour week could be expected to score about 7.5 points higher – nearly a full standard deviation on that subscale.[17]

5a. Among Air Force DCGS intelligence personnel, what is the relationship between self-reported levels of exhaustion, cynicism, and professional efficacy and self-reported intent to remain in the Air Force?

5b. Does this relationship differ among support personnel at the same installation?

It was hypothesized that burned out individuals are more likely to leave the Air Force. The answer to this research question will help commanders decide whether there is in fact cause for concern. The association of burnout with reenlistment intentions was assessed with the OLS regression models summarized below in Table 3.10. In each of these models, the dependent variable was Continue USAF. The sample size was not large enough to construct a model using all three burnout subscale scores in addition to demographic or occupational variables as covariates. The facets of burnout were first considered together, then individually.

When the three facets of burnout were considered together, the strongest relationship ($p < 0.01$) was found in the intel group: higher Professional Efficacy was positively associated with a

[17] See Figure 3.2 for means and standard deviations of burnout scores by group.

stronger intention to remain in the Air Force. Cynicism was the only statistically significant factor among non-intel personnel. However, the coefficients in both cases were very small. To see even a one-point change on the scale of reenlistment intentions, one would have to see a 10-20 point change in one of the burnout scores (quite a bit greater than a standard deviation). Nevertheless, The R^2 for each model (0.19 for intel, 0.24 for non-intel) indicated that about a quarter to a fifth of the variability in reenlistment intentions can be explained by only the three burnout scores.

When assessed independently of the other two facets, each facet of burnout was significantly related (most often $p < 0.01$) to turnover intentions in both groups. Again, the coefficients were quite small. The direction of the associations was unsurprising: higher burnout with decreased reenlistment intentions, and vice versa. Abnormal Shift was a significant ($p < 0.01$) covariate with Professional Efficacy for non-intel, and had a relatively large, negative coefficient – potentially enough to move from positive feelings about reenlisting to neutral, or from neutral to negative (see Figure 3.1a). Children at Home (for intel) and Supervisor (for non-intel) were two non-burnout variables strongly associated with increased reenlistment intentions ($p < 0.05$ and < 0.01, respectively). In general, more of the variability in USAF turnover intentions (up to about a third) was accounted for by the non-intel models than the intel models (one fifth or less).

Table 3.10 – Model Summaries of Variables Influencing USAF Turnover Intentions

Model #	5.1a	5.1b	5.2a	5.2b	5.3a	5.3b	5.4a	5.4b
Group	**Intel (n = 149)**	**Non-Intel (n = 74)**	**Intel (n = 131)**	**Non-Intel (n = 69)**	**Intel (n = 129)**	**Non-Intel (n = 68)**	**Intel (n = 131)**	**Non-Intel (n = 68)**
Exhaustion	-0.07	-0.07	-0.13***	-0.22***	-	-	-	-
Cynicism	-0.06	-0.13*	-	-	-0.15***	-0.20***	-	-
Professional Efficacy	0.10***	0.04	-	-	-	-	0.15***	0.10**
Children at Home	-	-	1.34**	-	1.14**	-	-	-
Low Experience	-	-	-1.06**	-	-	-	-	-
Supervisor	-	-	-	1.93***	-	1.94***	-	-
Married	-	-	-	-	-	-	1.04*	-
Physical Exercise	-	-	-	-	-	-	0.55*	-
Abnormal Shift	-	-	-	-	-	-	-	-2.47***
Constant	5.80	8.39	8.45	8.51	7.95	8.45	0.857	5.83
R^2	0.19	0.24	0.15	0.30	0.21	0.31	0.18	0.21

**p < 0.1; **p < 0.05; ***p < 0.01*

6a. Among Air Force DCGS intelligence personnel, what is the relationship between self-reported levels of exhaustion, cynicism, and professional efficacy and self-reported intent to remain in the current career field?

6b. Does this relationship differ among support personnel at the same installation?

This final research question was addressed in a manner analogous to the previous one. Continue Career Field was the dependent variable for the OLS regression models summarized in Table 3.11, which examined the relationship between burnout and intentions to remain in the current career field. An understanding of that relationship will provide insight for commanders into the organizational commitment of DCGS intelligence personnel. It is important for airmen to want to be doing their job, in addition to being proficient at it.

Higher burnout was associated with decreased intentions to remain in the career field. When all three burnout facets are considered simultaneously, Cynicism and Professional Efficacy are statistically significant ($p < 0.05$ and < 0.01, respectively). Considered independently of the other facets, each burnout facet is significant ($p < 0.01$ in most cases). Although these and the occupational variables in the model are statistically significant, the small coefficients indicate that their associations with turnover intentions are unlikely to be operationally significant. One possible exception is Abnormal Shift as considered with Professional Efficacy in the non-intel group, which could potentially account for a shift from positive feelings to neutral or from neutral to negative. Model R^2 values ranged from 11% to 24%, indicating there is much more than burnout that goes into an individual's intention to remain in his or her current career field.

Table 3.11 – Model Summaries of Variables Influencing Career Field Turnover Intentions

Model #	**6.1a**	**6.1b**	**6.2a**	**6.2b**	**6.3a**	**6.3b**	**6.4a**	**6.4b**
Group	**Intel (n = 149)**	**Non-Intel (n = 73)**	**Intel (n = 131)**	**Non-Intel (n = 68)**	**Intel (n = 129)**	**Non-Intel (n = 67)**	**Intel (n = 129)**	**Non-Intel (n = 67)**
Exhaustion	-0.03	-0.13	-0.09***	-0.22***	-	-	-	-
Cynicism	-0.09**	-0.07	-	-	-0.12***	-0.19***	-	-
Professional Efficacy	0.11***	0.06	-	-	-	-	0.124***	0.13**
Abnormal Shift	-	-	-1.37**	-	-1.21**	-	-1.20**	-2.34***
Supervisor	-	-	-	1.63**	-	1.68**	-	-
Constant	5.79	7.13	8.62	8.04	8.84	7.832	4.44	4.43
R^2	0.21	0.24	0.11	0.24	0.16	0.22	0.16	0.21

**p < 0.1; **p < 0.05; ***p < 0.01*

This chapter presented the results of several qualitative and quantitative analyses regarding sources of occupational stress, burnout, and the extent to which burnout plays a role in the turnover intentions of DCGS intelligence personnel. The implications of these findings are discussed in Chapter 4.

Chapter 4. Discussion

This chapter begins with a summary of the key findings from the analysis reported in Chapter 3. It then elaborates on the policy implications of the findings from each research question – either establishing an empirical basis for concerns about occupational burnout among DCGS intelligence personnel or making recommendations to Air Force leadership concerning the mitigation of occupational burnout. Suggestions for future research are also made, followed by a discussion of the study's limitations and strengths.

Summary of Key Findings

More than any other source of stress, DCGS intelligence personnel at Base X reported that issues concerning shift work and long hours affected their performance. Other top sources of stress included marital/family issues, nature of work, leadership management concerns and training/mentorship issues. The latter two were reported much more frequently in the intel group than the non-intel group.

Intelligence personnel reported significantly higher levels of emotional exhaustion and cynicism than their non-intel counterparts, and a greater proportion of the intel group met thresholds for high exhaustion and cynicism. However, both groups reported experiencing similar, generally high, levels of professional efficacy. Working an abnormal shift was significantly associated with increased burnout in all three facets for intel personnel, and working long hours was associated with increased exhaustion and cynicism. Younger airmen and those with less experience reported lower levels of exhaustion. None of the facets of burnout appeared to play a meaningful role in turnover intentions regarding either the Air Force or the current career field, though the strongest burnout-related factor in increased organizational commitment was high professional efficacy.

Implications of Findings by Research Question

1a. What are the main self-reported sources of occupational stress among Air Force DCGS intelligence personnel?

1b. Do these sources differ from those reported by support personnel at the same installation?

None of the top five sources of stress reported by the intel group at Base X was unexpected based on an understanding of the DCGS environment and the roles of intelligence analysts who work there. Indeed, of the five categories of risk factors for burnout among DCGS intelligence personnel posited in Chapter 1, four (Operational, Organizational, Deployed in Garrison and Demographic) were represented by the top five sources of stress. Some of these stressors were reported much more frequently among the intel group, making it reasonable to expect that the this group would be at greater risk for occupational burnout than the non-intel group.

For example, over 40% of intelligence personnel reported that shift scheduling and long hours was a top source of stress affecting performance, which was notably more than the 27% of the non-intel group that said the same. Almost 40% of the intel group reported stress due to balancing marriage and family roles with their job, and over a quarter of them included leadership management issues, which include non-communicated goals, objectives and plans as well as frequent, short-notice taskings. This was more of an issue for intel airmen than non-intel, among whom only 11% reported leadership management issues. Monotony, boredom, and sustained vigilance were reported by 25% of intel personnel, and over one fifth reported training and mentorship issues as a top stressor that affects performance (vs. just 6% of non-intel). The fact that these particular issues emerged as the top sources of stress for intel in greater proportion than for non-intel seems to confirm the notion that intel personnel face a unique work environment at the DCGS. Commanders should recognize that intelligence personnel are struggling with certain issues more often than they might in a "normal" job.

Despite the fact that airmen in intelligence positions are vicariously exposed to combat as part of their duties, no one in this sample reported combat-related factors as a source of stress that affected performance. This does not necessarily mean that such factors may not induce stress in different ways, just that airmen at Base X responding to this survey did not perceive combat-related factors as inhibiting their ability to do their job. It remains very possible that frequent exposure to images of death and destruction is a source of stress for some intelligence personnel working at DCGS. Commanders must remain cognizant that in this type of remote warfare, even non-deployed airmen are experiencing high levels of combat exposure and therefore may be subject to its effects.

2. Do self-reported levels of exhaustion, cynicism and professional efficacy among Air Force DCGS intelligence personnel differ from levels reported by support personnel at the same installation?

Intelligence personnel at Base X did report significantly higher levels of emotional exhaustion and cynicism than support personnel. In other words, airmen in the intel group feel emotionally drained by their duties, used up and unable to face another day much more frequently than airmen in the non-intel group. They also have a greater incidence of negative work attitude. In part as a response to emotional exhaustion, individuals become less interested and enthusiastic about their work, and may even begin to doubt its significance. As expected, intel airmen reported experiencing these feelings at higher rates than non-intel airmen. This evidence could reinforce the concern among Air Force leaders who regard DCGS intelligence personnel as an at-risk group.

Despite this, their scores for professional efficacy were generally high, indicating they felt some sense of meaningful personal accomplishment at least once a week, on average. Much of the literature on burnout would suggest that decreased personal accomplishment comes along with increased exhaustion and cynicism. Yet the three facets of occupational burnout do not appear to be inextricably linked in this sample. Even as they experience increased exhaustion and cynicism, intel airmen at Base X felt that they were effective problem solvers, important contributors to a worthwhile mission, and confident in their analytic abilities. This may be a result of the very public emphasis the Air Force has placed on the importance of ISR operations. Despite the more challenging aspects of their job, there seems to be little doubt among these intelligence analysts that the Air Force values their contribution.

3a. What proportion of Air Force DCGS intelligence personnel report high levels of exhaustion, high levels of cynicism, and/or low levels of professional efficacy?

3b. Do those proportions differ among support personnel at the same installation?

Much higher proportions of the intel group than the non-intel group reported feeling exhausted (29% vs. 6%) and cynical (23% vs. 11%) once per week or more. The implications of these disparities may cause serious consternation for intel commanders at Base X. As discussed in Chapter 1, all three facets of burnout are associated with numerous negative health outcomes as well as performance issues. Even as intelligence analysts are expected to remain alert and focused at all times, they are faced with conditions that would directly affect their ability to sustain this vigilance. Even as it is critical for them to fully engage with their assigned mission, they are pressured to distance themselves from the job that exhausts them.

If this is the case on a weekly basis for nearly a third of intel analysts at Base X, the leadership likely has good reason to be concerned for both subordinate airmen and their ISR mission. As mentioned in Chapter 2, this dissertation used rather conservative cutoffs for defining what constituted "high" exhaustion or cynicism. The intensity of experienced burnout for airmen meeting these thresholds was higher than that experienced by the top third of the general population. It would seem apparent that some factors exist about either the intel airmen themselves or their work environment that put them at greater risk for psychological health issues. It is precisely those factors that Question #4 sought to elucidate.

4a. Among Air Force DCGS intelligence personnel, what are the associations of demographic and occupational variables with self-reported levels of exhaustion, cynicism, and professional efficacy?

4b. Do these associations differ among support personnel at the same installation?

Due to limitations of sample size, this dissertation only evaluated the associations of four variables with burnout scores. Two of them (Young and Inexperienced) were associated with decreased exhaustion, and describe a large percentage of intelligence analysts at Base X. These airmen are the future of DCGS operations, and commanders should be encouraged that two factors over which they have no control are not associated with increased burnout. It may be that the relentless pressure of operational demands had not had time to manifest itself in increased levels of exhaustion for inexperienced airmen when they responded to the survey. It may also be that family-related risk factors for burnout do not apply to younger airmen as frequently (Young was negatively correlated with Married and Children at Home), and that helps explain why they had lower exhaustion scores. In any case, it is important to recognize that older, more experienced intelligence analysts at Base X appear to experience higher levels of emotional exhaustion.

Unlike age and time, commanders do have some control over those factors that were associated with increased burnout scores: abnormal shift scheduling (all three facets) and a long work week (Exhaustion). Specific recommendations concerning these two factors are detailed below. Other demographic and occupational variables should not be discounted. There are numerous risk factors hypothesized in Chapter 1 that were either not measured in this survey or not included in these models.

5a/6a. Among Air Force DCGS intelligence personnel, what is the relationship between self-reported levels of exhaustion, cynicism, and professional efficacy and self-reported intent to remain in the Air Force/current career field?

5b/6b. Does this relationship differ among support personnel at the same installation?

DCGS intelligence personnel do experience higher levels of emotional exhaustion and cynicism, but neither facet has an impact on turnover intentions – either for the Air Force or the current career field. In fact, the facet of burnout most strongly associated with turnover intentions (a negative association) was professional efficacy – and on average, intel personnel at Base X reported feeling efficacious once a week or more.

Unfortunately, even though it appears to not be influenced by burnout, attrition of intelligence personnel cannot be dismissed as a potential problem for the DCGS. Though this dissertation does not focus on the issue of retention per se, it did find that about one fifth of intelligence analysts at Base X intend to leave their career field and/or the Air Force. Compared to the non-intel group, a greater proportion of intel airmen responded negatively to the retention items and a smaller proportion responded positively (see Figures 3.1a and 3.1b). It was not assessed whether those differences were significant. Only half of intel personnel reported a positive intention to stay, while the rest provided more neutral responses. With those numbers, it would be difficult to make the case that many airmen are positively engaged[18] with their assignment. It should be noted that no airman can simply decide to change career fields one day, or even to leave the Air Force when they choose, so self-reported turnover intentions are not the best determinant of whether or not attrition is an issue. However, even an attitude of wanting to leave could be indicative of deeper issues in an individual that a commander would want to address.

[18] As described in Chapter 1, engagement may be conceptualized as one end of a continuum with burnout on the other end.

Recommendations

Three of the following recommendations are rooted in the specific findings of these analyses. They are focused more so on the prevention of burnout than treatment, based on the intersection of what factors contribute to burnout and which of those factors can be controlled by policymakers. Two additional recommendations are more general in nature and concern retention of DCGS personnel and the treatment of burned out individuals, respectively.

Recommendation #1: Minimize the need for extended working hours and abnormal shifts in a predictable and equitable manner.

Several options exist for commanders to minimize long hours or abnormal shifts. First, overseas sites that are part of the DCGS should be fully leveraged to reduce night scheduling in stateside installations. Though limited by the analytic capacity (both hardware and personnel) of these sites, this option could alleviate some of the pressure on the larger bases in the U.S. to be fully manned 24 hours a day. To reduce the number of man hours needed, automated technologies should continue to be developed and integrated into the DCGS. These systems are not expected to replace analysts, but have the potential to help by providing constant “eyes on” during the dull stretches of monotony – and then alerting a human operator when extra attention is required.

Another way to reduce the need for long hours is to commit to a smaller number of CAPs, commensurate with the current level of staffing. Alternatively, the supply of personnel could be allowed to “catch up” to fully authorized levels (reference Figure 1.2), and increase accordingly as additional responsibilities or CAPs are taken on. In considering these options, the importance of the mission must be emphasized. This dissertation is not recommending that the DCGS reduce its workload to alleviate burnout at the cost of operational success. However, there may be an occasion for DCGS to reevaluate its analytic capacity with current manpower levels as the war in Afghanistan draws down. The last decade has seen such a steady increase in mission-critical ISR operations that such evaluations have been difficult to perform. Until routine RPA operations are integrated into the national airspace, commanders may have an opportunity to realistically assess their optimal workload.

It is important that manning assignments be made in a predictable manner so as to help establish a routine. For example, having a work schedule based on a seven-day week (4 days on, 3 days off; or 5/2) will help minimize any disruption to personal or family obligations, such as child care arrangements. It will also help minimize the frequency of physical adjustments required by the body (e.g., circadian rhythm) when switching from one shift to another. Furthermore, scheduling should be fair. That is, the burden of working long hours and abnormal shifts should be spread evenly around the workforce. Maslach et al. (2001) report that unfair treatment (including inequity in workload) is "emotionally exhausting and upsetting…[and] fuels a deep sense of cynicism about the workplace."

Regarding this recommendation, future research should evaluate the manpower savings of PED-enabling technologies. Additional study is also needed to optimize the supply of intelligence personnel and the amount of analysis to which the DCGS should commit as it faces the next generation of operational challenges.

Recommendation #2: Promote a sense of professional efficacy through active encouragement and feedback.

An important finding of this research is that some intelligence personnel from Base X who were experiencing high levels of exhaustion and cynicism nevertheless reported a high sense of professional efficacy as well. It is essential that Air Force leaders support and encourage this feeling by continuing to emphasize the importance of the DCGS mission. The DCGS is part of the future of warfare, and is considered an indispensable aid in the current conflicts. Being a part of a new, technologically-advanced frontier of combat can serve as a strong motivator, even when the job is demanding and difficult. This may be especially true of young airmen and those new to their positions, who reported lower levels of emotional exhaustion. Rather than becoming intelligence analysts against their preferences,[19] the newest generation of analysts joined the Air Force with some choice about their career field. Any excitement of being a part of the DCGS should be promoted.

Commanders should also endeavor to provide meaningful feedback, as well as facilitate feedback on specific missions from supported units so as to regularly reinforce in their airmen a sense of personal accomplishment and ability. Maslach et al. (2001) write, "People may be able to tolerate greater workload if they value the work and feel they are doing something important." This is certainly consistent (though not necessarily a causal relationship[20]) with the observed data at Base X, which demonstrate a general intention to remain despite experiencing a difficult work environment. Commanders should work to keep it that way.

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[19] To fill the rapidly-growing ISR manpower billets, many airmen were cross-trained from other career fields, often involuntarily (Braisted 2011).

[20] Many factors besides personal feelings impact a decision about retention that were not evaluated here (e.g., a poor economy, family situations, incentive pay, etc.).

It would be helpful to have longitudinal, identifiable data to track burnout and actual retention behavior over time. Future studies must balance the difficulty in obtaining such data (e.g., confidentiality issues, stigma about psychological well-being, etc.) with the potential benefits of being able to trace an individual airman's experience of burnout throughout his or her time at the DCGS.

Recommendation #3: Determine what other factors contribute to occupational burnout among DCGS intelligence personnel, and which of those factors can be influenced by policy decisions.

The amount of variation explained by the intel group models of burnout risk factors was very low, ranging from 0.05 to 0.13. This indicates that as much as 95% of the variability in burnout scores is explained by factors not included in the models. Such factors could include those for which data was available, but the sample size did not allow their inclusion in the model – such as marital status, children at home, or gender. Other factors could include those that are discussed in Chapter 1 but were not measured for this research, such as sustained vigilance, lack of feedback, combat exposure, etc.

Given the myriad factors that can contribute to burnout, many are bound to be at least somewhat controllable through policy decisions. Commanders should make an effort to discover burnout risk factors they can influence. This knowledge would best be provided through a much larger, representative sample of DCGS intelligence personnel, specifically designed for that purpose. However, the challenges associated with acquiring such data are recognized.

Recommendation #4: Place a strong emphasis on retention of trained personnel in intelligence-related career fields.

As use of RPAs expands in numerical, geographic and operational scope, the civilian sector demand for PED skills will continue to grow. Private companies will be eager to obtain fully-trained, experienced intelligence analysts from the Air Force, and can offer much higher pay than the military (without the long hours). If sufficient manpower cannot be maintained at the DCGS, occupational burnout is likely to worsen for those airmen who remain.

As mentioned in Recommendation #2, future research should attempt to identify the key retention factors for DCGS intelligence personnel, and whether actual attrition is a concern for these airmen. Another study could include a cost-benefit analysis of losing a trained analyst to the civilian sector versus paying a bonus to incentivize the analyst to stay in the Air Force.

Recommendation #5: Use medical personnel to monitor and treat the DCGS intelligence analyst population for the three facets of occupational burnout.

Medical personnel assigned to DCGS locations are in a unique position to recognize and treat burnout. It is easier for co-located, integrated medical personnel to have a sense of the organizational climate in a unit than it is for an outside research organization to come in and attempt to conduct a new study. Based on these analyses, those airmen at Base X of greatest concern are older than 25, work long hours and abnormal shifts, and have been assigned to their current duties for more than a year. Resources for monitoring and intervention should be allocated according to these factors and any others discovered by implementation of Recommendation #3. Medical personnel can communicate with leadership concerning issues of occupational burnout in their units, and provide feedback both to leadership and individual analysts regarding the treatment of exhaustion, cynicism, or low professional efficacy.

Limitations and Strengths of the Study

Limitations

This research has several limitations which may preclude a broader application of its findings. First of all, the data are longitudinal. Therefore a causal relationship between any variables may not be inferred; the study is limited to reporting the information at a single moment in time. Additionally, the secondary nature of the data and small sample size ensure that any modeling was bound to have omitted variables. Because the original survey was not designed with all of the present research questions in mind (particularly 4, 5 & 6), the collected data did not include all relevant variables (i.e., specific measures for some of the notional risk factors for burnout, such as unit feedback or confidence in training). In any case, the small sample size limited the number of independent variables that could be used in a model.

This sample is not necessarily representative of all Air Force DCGS intelligence personnel, or even all intelligence personnel at Base X. The survey was anonymous, so respondents cannot be compared to non-respondents. Furthermore, with a response rate of less than 23%, response bias cannot be ruled out as a possible issue. There is simply no way to know if airmen chose to participate in the study differentially according to personal characteristics, including reported burnout. Finally, as a condition of being allowed access to the data, this dissertation was not able to report specific data comparing this sample and any other group, due to unit sensitivities. As a consequence of these factors, the generalizability of the study may be limited. However, a forthcoming study of psychological health issues among intelligence analysts conducted by USAFSAM includes a broader sample from multiple DCGS locations. This larger group of intel personnel is demographically very similar to the present sample, which may somewhat mitigate the limitations imposed by examining personnel at only Base X (Chappelle, 2012).

Strengths

The limitations notwithstanding, this dissertation has several important strengths. To the extent that the sample is generalizable to other intelligence personnel at Base X or other DCGS units, the study offers fresh insights and recommendations for commanders concerning the prevalence and mitigation of occupational burnout among their airmen. More broadly, there are lessons to be learned for any organization concerned about burnout or attrition. At a minimum, this dissertation addresses a current, relevant policy issue in a critical mission area for the Air Force. Even if the findings only apply to a sub-group of DCGS intelligence personnel at Base X (which constitutes a major component of the DCGS), they have the potential to make a real difference for those airmen and the operations they support.

This dissertation contributes to the literature on occupational burnout by examining the phenomenon in a new population of interest and validating the three-facet structure of the MBI-GS. By examining burnout in the DCGS intelligence community, it also contributes to the growing literature concerning psychological well-being of Air Force personnel. Finally, this dissertation proposes several new avenues of research for the future, including:

- Automating technologies to reduce PED manpower requirements.
- Evaluation of DCGS analytic capacity in a changing operational environment.

- Additional risk factors for occupational burnout among DCGS intelligence personnel.
- Longitudinal studies of burnout and actual retention behavior.
- Cost-benefit analysis of paying an incentive to retain a trained DCGS intelligence analyst.
- Some of these research efforts may benefit from the proficiency and experience of research personnel at USAFSAM, who continue to study a broader range of psychological health issues throughout the Air Force.

Summary

This chapter summarized the key findings of the research presented in Chapter 3, and contextualized these findings to the policy questions laid out at the beginning of Chapter 1. In short, an empirical basis was established for Air Force leadership's concerns about occupational burnout among DCGS intelligence personnel. Three recommendations were made to leadership aimed at preventing burnout: (1) reduce the need for extended hours and abnormal shifts, (2) promote a sense of professional efficacy to help keep individuals from becoming more burned out, and (3) determine what other burnout risk factors may be impacted by policy. Two additional recommendations concern: (4) prioritizing retention of trained intelligence analysts in the DCGS and (5) using unit medical personnel to monitor and treat burnout. Additionally, suggestions for future research were made and the limitations and strengths of the study were discussed.

Appendix A. Supplemental Tables

Top Sources of Occupational Stress Affecting Performance

Using the same content analysis process outlined in Chapters 2 and 3, stressors were ranked by their individual frequency of reporting, rather than by the number of people who reported them. The reason the results are not identical is because respondents could have reported one, two or three stressors. Also, a respondent could have reported multiple stressors that were coded into the same category. Additionally, there was a supplemental survey question asking for “any additional sources of stress,” which is why there are more than 375 stressors reported for the intel group.

From this perspective, the top five sources of stress for the intel group were the same, but with a slightly different order: Marital/Family Stressors, Shift Scheduling/Long Hours, Leadership Management, Nature of Work, and Training/Mentorship.

The top five sources were also the same in the non-intel group, and the order was also slightly different: Marital/Family Stressors, Shift Scheduling/Long Hours, Nature of Work, Extra Duties/Admin Tasks, and Personal Life Stressors.

The disparities between percentages of intel and percentages of non-intel are reduced from this perspective, especially in Shift Scheduling/Long Hours (3% vs. 14%), Leadership Management (2% vs. 16%) and Training/Mentorship (4% vs. 15%). The full results are shown in Table A.1.

Table A.1 – Frequency of Various Categories of Occupational Stress Affecting Performance Reported by Intel and Non-Intel Groups

Stress Category	Intel (n = 391)	Non-Intel (n = 141)
Marital/Family Stressors*+	15% (59)	21% (29)
Shift Scheduling/Long Hours*+	15% (58)	12% (17)
Leadership Management*	10% (41)	8% (11)
Nature of Work*+	8% (32)	10% (14)
Training/Mentorship*	7% (27)	3% (4)
Personal Life Stressors+	7% (27)	9% (12)
Extra Duties/Admin Tasks+	7% (26)	10% (14)
Sleep Issues	5% (20)	4% (5)
Manning	5% (19)	6% (9)
Personal Health	5% (19)	1% (1)
Organizational Work Related Problems	4% (15)	5% (7)
Financial	4% (14)	3% (4)
Deployment	2% (8)	1% (1)
Dual Military Member Challenges	2% (6)	2% (3)
PT Testing	2% (6)	2% (3)
PCS/Outprocessing	1% (5)	2% (3)
Geographic Location	1% (4)	1% (2)
Work Facility	1% (3)	1% (1)
Access to Base Resources	1% (2)	0% (0)
Death in the Unit	0% (0)	1% (1)

**Top five for Intel; +Top five for Non-Intel*

Cross-tabs for Pearson's Chi-Squared Tests on Research Question #3

Table A.2 – Exhaustion Cross-tab

		Exhaustion Threshold (≥20)		
		Meets	Under	Total
Intel	Count	47	114	161
	%	29.19	70.81	100.00
Non-Intel	Count	5	72	77
	%	6.49	93.51	100.00
Total	Count	52	186	238
	%	21.85	78.15	100.00

Table A.3 – Cynicism Cross-tab

		Cyncism Threshold (≥20)		
		Meets	Under	Total
Intel	Count	36	123	159
	%	22.64	77.36	100.00
Non-Intel	Count	8	68	76
	%	10.53	89.47	100.00
Total	Count	44	191	235
	%	18.72	81.28	100.00

Table A.4 – Professional Efficacy Cross-tab

		Professional Efficacy Threshold (≤12)		
		Meets	Under	Total
Intel	Count	7	150	157
	%	4.46	95.54	100.00
Non-Intel	Count	3	73	76
	%	3.95	96.05	100.00
Total	Count	10	223	233
	%	4.29	95.71	100.00

Odds Ratios for Experiencing High Levels (above Threshold) for Each Facet of Occupational Burnout

Table A.5 – Odds Ratios for Intel Group Meeting Threshold for High Levels of Exhaustion, Cynicism, and Professional Efficacy

	Value	**95% Confidence Interval**	
		Lower	Upper
Exhaustion (n = 238)	5.937	2.255	15.630
Cynicism (n = 235)	2.488	1.094	5.656
Professional Efficacy (n = 233)	1.136	0.285	4.519

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